# REPORT

OF THE

# Indian Tariff Board

ON THE

# NON-FERROUS METALS INDUSTRY

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# REPORT ON THE NON-FERROUS METALS INDUSTRY

## CHAPTER I—PRELIMINARY

**Reference to the Board.**

The claim of the non-ferrous metals industry for protection and assistance was referred by the Department of Commerce, Government of India, to the Tariff Board for investigation and report in their Resolution No. 218-T(55)/45, dated the 3rd November 1945, *vide* Appendix I. The Resolution stated, *inter alia*, that, pending the formulation of a tariff policy appropriate to the post-war needs and conditions of the country and the establishment of a permanent machinery for investigating claims from industries, which had been started or developed in wartime and which were established on sound lines, to assistance or protection during the transition period. Recommendations for protection, if any, are to be limited to a period of three years by the end of which it may be possible to review the position in the light of conditions prevailing at the time. For the present the main object of our enquiries is to hold a summary investigation and to devise measures calculated to enable wartime and struggling industries to survive in the transition period, provided that the industry concerned gives fair promise of becoming self-supporting in the long run. For a detailed exposition of the policy, principles and procedure followed by this Board in the enquiries entrusted to it, a reference to our report on calcium chloride is invited.

**Application for protection.**

2. Initiative for the reference of the case of the non-ferrous metals industry to the Tariff Board was taken by Messrs. Kamani Refinery and Metal Industries, Bombay, which made an application for the purpose on the 15th September 1944, relying on the press note of the Government of India dated the 26th March, 1940, assuring protection to industries which were directly needed for the war effort and the development of which was essential for the war needs as also to industries which supplied the essential requirements of the civilian population. Some of the other firms which applied for protection were (1) the Prakash Engineering Company of Agra City—*vide* their letter dated the 11th June 1945—interested in brass and copper rods, non-ferrous castings and certain non-ferrous alloys, and (2) Messrs. Bombay Brass Works, Jullundar City, *vide* their application dated the 31st December 1945—interested in the manufacture of valves, taps and cocks of all sorts and generally in steam and sanitary fittings. The Kamanis are interested in arsenic copper rods, refining of scrap, production of alloys in various forms and rolling of rods and sheets. The Kamanis asked for an assurance of protection in the middle of the war period, but Government decided that the claim of the industry for protection should be examined by a Tariff Board in due course after the termination of war. In this connection it may be mentioned that the Planning and Development Department of the Government of India had appointed a Non-ferrous Metals Panel which went into the question of requirements and development of the industry as a whole and which has made certain recommendations which are now before Government for consideration. Possibilities of establishing a non-ferrous metals industry in India were also examined by the Metals Committee, appointed in 1942 by the Board of Scientific and Industrial Research and presided over by Sir J. J. Ghandy of the Tata Iron and Steel Company Ltd.

**History of the Industry.**

3. Although non-ferrous ores have been known to exist and have been worked in India since ancient times, the non-ferrous metals industry in its present or modern form is essentially a wartime development. It is known that copper at one time used to be smelted in large quantities in Southern India, Rajputana, Singhbum (Bihar) and the sub-montane regions of the Himalayas; but today, India is dependent for most of her requirements of copper upon supplies from abroad. Lead and zinc are reported to exist in many places, such as, Udaipur, Hazaribagh, and Singhbum; but, except for a small production of lead recently started, both these metals are imported from abroad. Similarly, although nickel and cobalt, used mainly for alloys, are known to exist in the ore form in Nepal, and tin is known to occur in Hazaribagh, all the three metals are at present imported. Among the pioneers in the exploitation of India's non-ferrous wealth by modern metallurgical methods may be mentioned the Indian Copper Corporation which commenced manufacturing copper from ore in 1924, as also brass ingots, sheets and circles from Indian copper in 1928. Another company which has played an important part in the development of the non-ferrous metals industry in India is the Indian Cable Company which was formed in 1920 for the purpose of manufacturing copper wire and strand for telephone, telegraph and transmission lines, rubber-insulated cables, and cotton-covered wires. Before the war, there was practically no other smelting and refining of non-ferrous metals or alloys nor fabrication of semi-finished products such as rods, sheets or wires. Even in the case of brass sheets, in which there was considerable local production from scrap, the indigenous output, including that of the Indian Copper Corporation, was barely sufficient to meet 40 per cent. of India's pre-war requirements. With the outbreak of the war, the country could not obtain a large part of essential supplies of non-ferrous metals and alloys including manufactures. The position was aggravated with the entry of Japan into the war, as supplies of tin from Malaya and of lead and zinc from Burma upon which India mainly depended were also cut off. This led to the setting up of factories for the refining of scrap which before the war used to be exported mainly to Germany and Japan. This enterprise, actively encouraged by Government, achieved considerable success, so much so, that to-day, the smelting and refining capacity of both yellow and white metal alloys is in excess of the present requirements of the country. The present smelting capacity per annum on the basis of 24-hour working is reported to be about 1,40,000 tons for both yellow and while metals against a total estimated demand of about 1,17,000 tons. The bulk of this capacity is in the yellow metals, the division being roughly 1,00,000 tons yellow metal and 40,000 tons white metal. Plans are in progress for electric furnaces which when installed are expected to yield an additional capacity of about 30,000 tons of yellow metals. Although there was some production of non-ferrous castings such as steam and sanitary fittings and engineering castings before the war, the industry received a strong fillip during the war and can now be said to have been established. Progress was not, however, confined to refining of scrap and manufacture of alloys and castings. The war witnessed the establishment of a second cable factory equipped with modern machinery as also of a rod mill having capacity for the production of enough black copper rods to feed both the cable factories in the country. The shortage of lead has revived the exploitation of the lead mines in the Jaipur and Udaipur States and the manufacture of pure lead ingots. There has been little progress in the development of our zinc resources, apart from the prospecting of the Zawar mines by the Utilisation Branch of the Geological Survey of India and latterly by the Metal Corporation of India Ltd.; but mention should be made here of the setting up of a de-tinning plant in Bombay

which seeks to recover tin from tin-plate scrap which otherwise used to be exported abroad. In this report we are not dealing with aluminium and antimony, two important non-ferrous metals, as they have been dealt with by us previously in separate reports.

**Method of inquiry.**

4. All the known producers of non-ferrous metals were addressed on the 24th January 1946 to submit their representations, with particular reference to the questionnaire issued for the purpose by the Board. The list of persons to whom the questionnaire was issued will be found in Appendix II. Similarly, a large number of consumers, *vide* Appendix III, were addressed with a view to eliciting their reactions to the claim for protection of and assistance to the non-ferrous metals industry. Importers were addressed to ascertain the volume of pre-war imports, the pre-war and present landed costs, the prospects of post-war imports and the probable demand of non-ferrous metals in the course of the next three years (Appendix IV). Amongst associations whose views were invited may be mentioned the Engineering Association of Calcutta, the Indigenous Manufacturers Association, Calcutta, the Metal Exchange Association, Ltd., Bombay, the Indian Merchants Chamber, Bombay, the All-India Muslim Chamber of Commerce and Industry, Bombay, the Indian Chamber of Commerce, Calcutta, the All-India Non-Ferrous Metalware Manufacturers' Association, Bombay, the South Indian Metal Distributors' Association, Madras, the Marwari Chamber of Commerce, Bombay, and the Indian Non-Ferrous Metals Manufacturers' Association, Calcutta. A list of factories visited by, or on behalf of, the Board is given in Appendix V. The names of factories which were costed to ascertain the cost of production with a view to comparison with landed costs of similar articles will be found in Appendix VI. Public inquiry into the case was held in Bombay from the 10th to the 16th September 1946. A list of the witnesses examined by the Board is given in Appendix VII.

**Plan of report.**

5. For the purpose of our report, we have divided the enquiry into four parts, namely :—

I. Production of primary or virgin metals from ores.

II. Production of secondary metals, the refining of scrap and the manufacture of alloys.

III. Semi-manufactures, such as sheets, circles, strips, bars, rods, pipes and tubes.

IV. Manufactures, such as wires, cables, conductors, water and steam fittings, castings for general engineering purposes, and sheet metal products.

We shall take up each of these categories one by one in the order mentioned above.

## CHAPTER II—PRIMARY OR VIRGIN METALS

**The list of primary metals dealt with.**

6. In this chapter we deal with copper, lead, zinc, tin, nickel, chromium, cobalt, tungsten, and magnesium.

**Copper : History occurrence and production.**

7. The occurrence of enormous heaps of copper slag in various parts of the country testifies to the existence of a copper mining and smelting industry in days gone by. At all these places, copper was smelted from local ores and was used in the manufacture of copper alloys, such as brass, bronze and gun metal. At present, however, the Indian Copper Corporation is the only producer of virgin copper from ore. Its production is about 6,000 tons of refined copper per year. The smelter of the Indian Copper Corporation is situated at Ghatsila on the Bengal-Nagpur Railway in Bihar, and its mines are situated in the vicinity. The ore mined by the Indian Copper Corporation is comparatively of poor quality, the copper content being roughly 2 per cent. Veins have been found in which the copper content has been as high as 4 per cent., but the average is reported to be about 2 per cent. Although the Singhbum copper ore belt has been prospected and reported upon somewhat discouragingly by the Geological Survey of India, it seems possible that further examination and proving of the deposits in proximity to the existing mines of the Indian Copper Corporation might reveal other valuable ore reserves from which additional supplies of copper might be obtained. Other places where copper ore is known to exist in considerable quantities are the States of Sikkim, Mysore and Jaipur. Practically the whole of the copper produced by the Indian Copper Corporation is converted into brass by being melted in electric furnaces with the addition of proportionate amounts of zinc. The brass which is cast into blooms is rolled in the rolling mills into brass sheets, strips and circles. The Indian Copper Corporation is a public limited company registered in London and managed by a Board of Directors in the United Kingdom. The shares of the company are quoted in India and it is stated that over 80 per cent. of the shares are held by Indian investors. The management of the concern is, however, vested wholly in a British Board of Directors. Extraction of copper at Ghatsila is entirely by the fire-refined process, there being no equipment for production of electrolytic copper. It is also said that the ore is not suitable for the electrolytic process owing to absence of precious metals, as also due to existence of impurities, especially nickel. There being no other centre of production of copper, all the electrolytic copper required by the country has to be imported from abroad.

**Uses of copper.**

8. Copper is by far the most important non-ferrous metal. It is used in large quantities in various electrical and engineering industries. The main features of pure copper are high electrical and thermal conductivity and malleability. Besides being used in its pure form, copper is alloyed with zinc and tin to produce yellow metals such as brass and bronze which have a very wide use in India for cooking utensils and other house-hold articles.

**Copper : Domestic production and demand.**

9. Having regard to the pre-war copper trade and possibilities of post-war development of electrical and other industries in the country, our estimate of the average annual requirements of copper during the next few years is as follows :—

| | | *Tons.* |
|---|---|---|
| Electrolytic copper | .. | 10,000 |
| Copper for copper-base alloys other than brass | .. | 20,000 |
| Semi-manufactures of brass and copper | .. | 40,000 |
| Total | .. | 70,000 |

The total production during the same period is estimated at 7,000 tons per annum by the Indian Copper Corporation and about 5,000 tons per annum by recovery from scrap. It will thus be seen that the country will have to import annually something like 58,000 tons of copper, electrolytic as well as fire-refined.

**Copper : Cost of production ; landed cost and case for protection.**

10. The figures of cost of production of the Indian Copper Corporation were examined carefully by the Cost Accounts Officer deputed for the purpose by the Board. The result of our examination discloses the cost of production inclusive of profits to be Rs. 1,069 per ton—*vide* Appendix VIII. On the other hand, the landed cost of virgin copper at present is as follows :—

| | | Rs. | a. | p. |
|---|---|---|---|---|
| F.o.b. price, London, according to the London Metal Exchange (£ 84). | | 1,120 | 0 | 0 |
| Cost of freight, insurance, etc. | .. | 180 | 0 | 0 |
| Handling charges | .. | 20 | 0 | 0 |
| Total landed cost | .. | 1,320 | 0 | 0 |

It will be seen from a comparison of the two figures, namely, the cost of production and the cost of importation, that the Indian Copper Corporation is well covered by the present import price of copper, without duty. The representatives of the Corporation who gave evidence at the inquiry admitted that the position was as described above and that there was for the present no case for the protection of the copper industry in India, even if the production of copper was taken by itself and not in the context of production of brass sheets and circles in which form only practically the entire output of the Indian Copper Corporation was put on the market. Since the reference of the case of the non-ferrous metal industry to the Board, the Indian Copper Corporation has made different requests at different times. At first, the Corporation viewed the removal of duty on copper, which was announced by Government on the 9th March 1946, with great concern and asked that either the duty should be reimposed or a subsidy should be paid equal to the amount of the duty. Later, the Corporation withdrew this request on the ground that the world price of copper had risen and that at that price the production of copper in India was well covered. Its latest position is that, while no special protection or assistance is needed so long as the relation between the cost of production and the cost of importation remains what it is today, an assurance should be given to the industry that, in the event of this balance being upset to the detriment of the Indian Copper Corporation, the question of protection will be reconsidered. In dealing with the case of the Indian Copper Corporation, certain difficulties arise out of the constitution of the Corporation. That it is British concern with a wholly British Board of Directors somewhat detracts from its claim for protection, whatever may be the strict constitutional position. The Board enquired whether the Corporation had any plans for conversion of the sterling company into a rupee company and for reconstitution of the Board of Directors, and was informed that, although the Corporation had some such plans before the war, there is no such proposal for immediate consideration and that the Board of Directors of the Corporation in London has been carefully watching the situation. The Board wishes to emphasise that regard being had to the deficiency of India in copper, every possible step should be taken to encourage the copper-mining industry and that in any case care should be taken to ensure that the progress achieved so far in this direction is not retarded by making import of copper more attractive than extraction of copper from Indian ore. This situation should not, however, lead Government into extending any protection or assistance to a concern the management of which does not conform to the requirements which may be regarded as the minimum for becoming eligible for assistance at the hands of the Indian Government or at the cost of the Indian consumer. We would, therefore, take this opportunity to impress upon the management of the Indian Copper Corporation the desirability of converting the sterling company into a rupee company and the constitution of a Board of Directors in which the Indian investors will have a predominant voice. The Corporation should be given an assurance that, if the c.i.f. price of copper at an Indian port falls below the then cost of production of copper by the firm at Ghatsila, the Corporation will, subject to the fulfilment of the abovementioned condition, be entitled to ask for reconsideration of the case for protection or assistance. It is hoped that when this assurance is given, the Corporation will be able to go ahead with its plans for extension of the mining operations involving heavy capital outlay. It need hardly be added that the fact that the Corporation converts practically the whole of its copper into brass products will be a relevant consideration in the examination of the case for protection at the appropriate time. The import of copper unwrought and copper scrap free of duty should of course be continued.

**Lead.**

11. There was practically no production of lead in India before 1942-43 when it was started for the first time by the Metal Corporation of India, Ltd., Calcutta. Till then, Burma was the chief supplier of India's lead requirements. During the war, the Burmese supplies were cut off and India had to depend mainly upon Australia for its requirements. Lead ore is mined in many countries in association with zinc ore. The U. S. A. is the most important source and contributes roughly one-third of the annual world output. The other producers of lead are Australia, Mexico, Canada, Germany, Spain and Burma. There is at present no duty on lead ingot and lead scrap. Lead has been known to occur in a number of places in India, such as Hazaribagh in Bihar, Drug in the Central Provinces, Datia and Gwalior in Central India, and Udaipur and Jaipur in

Rajputana. The only lead deposits which are being exploited at the moment are the Zawar mines in the Udaipur State and the Banjari mines in the Jaipur State in Rajputana. Both these deposits are controlled by the Metal Corporation of India, which proposes to carry lead concentrates from Rajputana to its smelter at Tundoo near Dhanbad in Bihar. So far, the Metal Corporation has produced only about 150 tons of lead from handpicked ore, but it has installed machinery and equipment which will enable it to produce 6,000 tons of lead ingot per year with effect from the middle of 1947. As the production achieved hitherto has not been on any commercial scale, it has not been possible to ascertain the cost of production with a view to making a comparison with landed cost of lead in order to see what measure of protection, if any, would be necessary. The estimated cost of production as anticipated at present by the Company is Rs. 427 per ton of lead ingot as against the landed cost of Australian lead of Rs. 860. The Indian cost may go down still further if the associated zinc ore could also be commercially exploited. The representative of the Metal Corporation stated before the Board that it would not be possible for him to say definitely what his cost of production would be next year, but that, if the world price of lead remained as high as it is today, the Indian production could be achieved at less than the landed cost, there being then no necessity for a protective duty. The Indian requirements of lead are estimated to be 15,000 to 18,000 tons per annum, whereas the Indian production would in the course of the next three years, hardly exceed 6,000 tons per annum. There will thus be a considerable gap between the home production and the home requirements which will have to be bridged by imports from abroad. As lead is required mainly for industrial purposes and for manufacture of pigments ; it is but right that it should be made available to the consuming industries at as low a cost as possible, and this can be done only if there is no duty, revenue or protective, on lead. The present position according to which there is no duty on lead ingot and lead scrap is, therefore, satisfactory and should be continued. Since, however, it is essential that production of lead in India should be stepped up so as to be able to meet the entire demand, we would recommend that Government should make a formal declaration that the case of the lead industry for assistance will be considered sympathetically during the next three years provided that (1) the production of lead is carried on scientific and sound business lines and (2) the cost of production of Indian lead is found, on strict cost accounting, to be unremunerative as compared with the cost of importation of lead at the time of such examination. It is hoped that with this assurance lead production in India will receive a stimulus and that, in course of time, the country will become self-sufficient in respect of lead supplies. A word may perhaps be added here to explain why it is economical to have the smelter at Dhanbad although the mines are so far away (1300 miles) in Rajputana. The freight on ore from the mines to the smelting factory works out to Rs. 30 per ton. In order to get one ton of metal, one and a half tons of concentrated ore are required. On this basis, the freight on ore for one ton of metal comes to Rs. 45. As against this, if one ton of metal itself were transported from the mine-head to Calcutta, the freight on metal will be Rs. 67, it being only slightly less for delivery at Dhanbad. Thus, from the point of view of freight, it is desirable that the smelter should be nearer the centre of consumption of lead as also the source of supply of coal, than at the mines themselves. As for the possibility of maintenance of lead supplies from the Zawar mines, the Board gathered from the representative of the Metal Corporation, which was subsequently verified by an officer of the Geological Survey of India, that in Zawar there are four hills containing lead, of which so far only one hill has been developed. *Prima facie*, there appears to be good prospect of a steady flow of lead concentrate to feed the smelter at Tundoo for some years to come. The representatives of the Metal Corporation requested that assistance may be given to them by way of issue of import licences for securing certain machinery from U. S. A. in preference to the United Kingdom, as the U. S. A. deliveries were much quicker than those from the United Kingdom. We recommend that all these facilities should be given including the necessary dollar exchange. The lead produced in India by the Metal Corporation is stated to be 99·9 per cent. pure, which is as good as any imported from abroad.

Imports of lead into India from 1937 were as follows :—

| | *Tons.* |
|---|---|
| 1937 .. .. .. .. | 7,000 |
| 1938 .. .. .. .. | 6,400 |
| 1939 .. .. .. .. | 12,500 |
| 1940 .. .. .. .. | 14,000 |
| 1941 .. .. .. .. | 16,000 |
| 1942 .. .. .. .. | 9,006 |
| 1943 .. .. .. .. | 14,007 |
| 1944 .. .. .. .. | 22,003 |
| 1945 .. .. .. .. | 9,000 |

The trend of world prices of lead may be seen from the graph in Appendix IX.

**Zinc.**

12. There is no production of zinc in India, nor is it likely to be produced in commercial quantity during the next three years. Zinc is found in the Zawar mines in the Udaipur State in association with lead which is already being commercially exploited, but it is not clear as to whether the Metal Corporation will make zinc oxide or use the zinc portion of the ore in any other manner. The Indian requirements of zinc are 50,000 to 60,000 tons per annum, including the consumption of zinc oxide. The total quantity of zinc ore proved so far at Zawar is said to be about 30,000 tons, capable of yielding about 6,000 tons of zinc, which indicates the poverty of India in zinc and dependence of the country on imports for its requirements of this metal. Zinc is used mainly in alloys, and particularly in the production of brass. Zinc is also used for the galvanization of steel sheets and wires. The third principal use of zinc is in the manufacture of pigment, for which purpose it is required in the form of zinc oxide. Both before and during the war, zinc has been imported from Australia which continues to be the main source of India's zinc supplies. The biggest producer as well as the biggest consumer of zinc in the world is the United States of America. There being no zinc industry in India, and zinc being required as a raw material in a number of industries, there has been no duty on zinc and that position is satisfactory and should be continued. There should be no duty on zinc ingots, slabs, blocks, or bars. There should be no duty on zinc scrap which should also be imported to supplement our zinc resources.

**Tin.**

13. There is no production of tin in India, nor have any large tin deposits been found or proved. Before the war, India used to depend upon Malaya for the supply of tin; during the war, the supplies were controlled by the International Tin Control Board, and India had to receive her quotas through the United Kingdom Ministry of Supply. India's quota was fixed at about 2,000 tons per annum in the light of pre-war consumption. The consumption of tin in India before the war was on an average 2,500 tons a year; whereas the estimated post-war consumption is 6,000 tons, the increase being chiefly accounted for by the development of the alloy industry in wartime. Tin is used mainly in (1) manufacture of tinplate and (2) production of alloys, such as solder, type metal, anti-friction white metal, bronze and gunmetal. There is at present a specific revenue duty of Rs. 375 per ton of tin. The landed cost of tin, inclusive of customs duty, is made up as follows :—

| | *Per. ton* | | |
|---|---|---|---|
| | Rs. | a. | p. |
| F.o.b. price (London) .. .. .. | 5,020 | 0 | 0 |
| Freight, insurance, etc. .. .. .. | 214 | 11 | 0 |
| Handling and clearing charges .. .. | 11 | 8 | 0 |
| Duty (specific) .. .. .. | 375 | 0 | 0 |
| Total landed cost (inclusive of duty) .. | 5,621 | 3 | 0 |

The releases of tin are at present controlled by Government and the rate at which tin is issued to consumers is at Rs. 316-4-0 per cwt. or Rs. 6,324 per ton which includes an addition of 12½ per cent. on landed cost representing handling charges by Government. Since there is no tin industry as such in the country, consumers of tin have represented that assistance should be given to them by (1) removal of duty on tin, (2) securing a higher quota for India by direct negotiation with the International Tin Control Board instead of going through the British Ministry of Supply, (3) removal of duty on tin scrap, and (4) ban on export of tin and tinplate scrap from the country. If our alloy industry is to compete successfully with import of alloys from abroad, then the price at which alloy manufacturers in India get their requirements of tin should be more or less the same as the price at which manufacturers of alloys receive their tin, for instance, in the United Kingdom. Removal of duty on tin and tin scrap, therefore, appears to be the first action that should be taken to put manufacturers of tin-based alloys in India in parity with foreign manufacturers; and we recommend that the duty on tin and tin scrap should be removed. Similarly, there is no reason why India, in the context of the new status which she has now acquired should be tied to the United Kingdom for her tin requirements and why this country should not have direct access to the International Tin Control Board for its full share of tin. Every attempt should be made to have the Indian quota raised from 2,000 tons to a figure approaching 6,000 tons which can be easily absorbed if available. The request for a ban on export of tin scrap will be considered when we come to the general question of export of scrap of all kinds which should be prohibited in order to conserve our metal supplies as also to provide our refining industry with the requisite raw material. Considering our shortage of tin, the de-tinning industry deserves mention. A de-tinning factory has been set up in Bombay by Messrs. Adamji Lookmanji which is an associate firm of the Indian Standard Metal Works and is said to have been working economically during the war. Such industries are known to exist in other countries where deficiency in tin is experienced, e.g., the United Kingdom, the United States of America, and Germany. The local de-tinning industry will be assisted if (1) the duty on tinplate scrap is removed and (2) export of tinplate scrap from India is prohibited.

**Nickel.**

14. There is at present no nickel industry in India, there being no known large-scale nickel deposits. We are dependent for our nickel supplies upon Canada which is the principal source of nickel in the world. Our requirements of nickel are estimated to be 2,000 tons, the bulk of which is consumed by the Mint for coinage purposes. Nickel is used by steel companies in the production of alloy steels. Nickel is also required in the production of nickel silver, cupro-nickel, and certain other non-ferrous nickel alloys. Nickel is required in the electro-plating industry in the form of nickel anodes. Nickel is also required for the production of nichrome wire which is mainly used for electrical appliances. There is at present a duty of 30 per cent. on nickel and nickel alloys, including nickel silver. The Tata Iron and Steel Company, Ltd., represented that the duty on nickel should be removed in order to encourage the production of alloy and special steels which they were manufacturing but in regard to which they were handicapped by the duty on nickel. India is deficient in the production of alloy steels. There is no duty on nickel in countries which do not manufacture nickel, such as Australia and the United Kingdom; and what the representative of the Tata Iron and Steel Company asked was that India should be placed in an equally advantageous position in regard to the price of nickel. Certain manufacturers of non-ferrous alloys and consumers of nickel anodes also urged that the duty on nickel should be removed with a view to encouraging the alloy industry as well as the electroplating industry. This request was reinforced by a representative of the Mond Nickel Company who attended the public inquiry and who pointed out that his company had made a request to this effect to the Government of India which in turn had passed the request to the Tariff Board, presumably for consideration along with the case of the non-ferrous metals industry for protection or assistance. The representative of the Mond Nickel Company laid stress on the fact that the Finance Member of the Government of India had stated in his Budget Speech of the 28th February, 1946, that Government intended to give relief by way of removal of customs duty on raw materials not manufactured in India but required by consuming industries. He also mentioned that his firm had maintained a steady price for nickel throughout the war as also throughout all the markets of the world and that levy of duty in India placed industries consuming nickel in a position of disadvantage as compared with similar industries in the other countries of the world. He pointed out that the price of nickel which was £ 180 per ton in 1937 was raised to £ 190 per ton in September 1939, and that it has remained steady ever since. He argued that the case of nickel was on all fours with that of zinc which was imported duty free, there being no zinc industry in the country and zinc being required for alloys much the same as nickel was required. The Board is satisfied that there should be no duty on nickel required for non-ferrous alloys, for electro-plating and for the production of nichrome wire. Removal of duty on nickel required for the production of special alloy steels and nickel alloys made by the Tata Iron and Steel Company, Ltd., would have been considered while examining the case of that particular industry

for protection and assistance. The removal of duty on nickel required by one industry while maintaining the duty on nickel required for some other industry would, however, create complications and cause administrative inconvenience which would not be worthwhile especially when it is realised that the bulk of nickel imported into the country is consumed by Government in whose case removal of duty would be but a book adjustment rather than loss of revenue. The percentage of nickel used in non-ferrous alloys is flexible and it would be possible for an alloy producer to consume less nickel and yet to claim rebate on a larger quantity. For these reasons and in view of the fact that removal of duty on nickel imported into India would place consumers of nickel in India on a competitive basis with similar producers in other countries, notably the United Kingdom, we recommend that the duty on nickel should be removed, although the duty on nickel alloys should remain at the present level, i.e., 30 per cent. *ad valorem* but protective rather than revenue.

**Other non-ferrous metals.**

15. The other non-ferrous metals that may be considered are cobalt, chromium, tungsten and magnesium. None of these metals is made in India and, therefore, there is no question of the protection of industries producing them. The metals are used in alloys and their case is comparable to that of zinc, tin, and nickel. The quantities required are small and the revenue likely to be sacrificed insubstantial. On the other hand, the encouragement which the removal of the duty will give is likely to be great and will, in the opinion of the Board, outweigh considerations of revenue. The case for the removal of duty on cobalt was pressed by the representative of the Tata Iron and Steel Company and the case for the removal of duty on magnesium was urged by Industrial Importers and Engineers, Ltd., Calcutta, who have recently been given a licence for import of magnesium from Canada. Magnesium is used in the production of aluminium magnesium alloys. The consumption of magnesium during the war was about 500 tons although the pre-war consumption was probably much less. The consumption of cobalt is roughly 20 tons. Cobalt is used (*a*) in the steel industry and (*b*) in the form of cobalt salts in the manufacture of glass. Tungsten is required for manufacture of high speed steel but figures of consumption are not readily available. Consumption of tungsten should not exceed 50 tons a year. Chromium is used for chromium plating and for the production of die steel and stainless steels. The duty (at present 30 per cent. *ad valorem*) on all these metals should be removed as (1) they are raw materials for other industries, (2) they are not produced in India, (3) they do not yield substantial revenue and (4) it is desirable to put the Indian producers of alloys of these metals on a competitive basis with producers in other competing countries like the United Kingdom. An additional reason why we recommend removal of duty on magnesium is that the raw materials for the production of magnesium are available in the country but their exploitation will depend upon the use of magnesium and creation of a demand for the metal. Should the metal be imported free of duty, its consumption will grow and, with the creation of this demand, it is likely that a magnesium industry may be established in the country, taking advantage of the availability of the raw materials which are magnesite and dolomite. It is hardly necessary to add that this concession of removal of duty should exist only so long as there is no production of these metals in this country.

## CHAPTER III—SECONDARY METALS, ALLOYS AND REFINING OF SCRAP

**List of secondary metals dealt with.**

16. Secondary metal may be defined as metal recovered from commercial scrap, that is scrap that has entered the processor's plant in scrap form. In contrast to virgin or primary metals, i.e., metals extracted from ores, secondary metals are of a secondary origin and result from the use of primary metals and alloys. Amongst alloys which will be considered here are brass, bronze, gun metal and white metals of all kinds. The refining process is comparatively simple although the sorting and segregation of scrap is somewhat difficult and laborious. Usually, coke-fired pit furnaces and oil and coke-fired tilting furnaces are used for the melting of scrap, and the machinery required for the purpose is of a simple nature. In addition to the above mentioned furnaces, oil-fired reverberatory and rotary furnaces and electric furnaces are also used for the purpose. Kettles are used for white metals and soft alloys. The raw materials used in the refining process are (1) scrap metals, residues and ashes from various smelting and engineering shops, (2) rejected domestic utensils, (3) cuttings and borings of metals and alloys and (4) virgin metals required to attain the desired composition. The raw materials are partly indigenous and partly imported. The manufacture of standard alloys from scrap is the most important function of the secondary metal industry. In almost all cases, it is necessary to add some amounts of virgin metals to the scrap composition in order to bring it to a standard specification. The secondary metal industry is located mainly in Calcutta and Bombay with fairly important units in Jaipur, Meerut, Mirzapur and Madras. The leading members of the secondary metal industry are (1) Binanis of Calcutta, (2) Kamanis in Bombay and Jaipur, (3) Bengal Ingot Company, Calcutta, (4) Eyre Smelting Works, Calcutta, (5) Indian Smelting and Refining Company, Bombay, (6) Bombay Metals and Alloys, Bombay, and (7) Indian Standard Metal Works, Bombay, to mention only a few names. Their main activity is production of brass and gun metal ingots and white metal alloys.

**Brass ingots.**

17. The most important alloy that came up for consideration was brass. Brass is an alloy of copper and zinc ordinarily in the proportion of either 70 : 30 or 60 : 40. The 70 : 30 brass is required mainly for engineering purposes whereas the 60 : 40 brass is used for domestic purposes and is therefore a more common variety. Manufacture of brass has been in existence in India almost in every part since ancient times, but mostly on a cottage industry scale. Manufacture of brass was also resorted to by hereditary artisans engaged in the costing of brass and bell-metal wares. Apart from these cottage workers, there were one or two factories engaged in the refining activity. Prior to war, large quantities of scrap in all forms were being exported to refineries overseas. Countries like Germany, Japan and U.K., which used to import all such scrap, sorted and graded the same and resold the material to refineries which utilised it in the production of various industrial alloys after refining and sweetening with virgin metals wherever required. These alloys came back to India for industrial and domestic consumption, there being no organization in the country for a proper utilisation of the scrap and for the production of the alloys. Appendix X gives a statement of exports of metals (mainly scrap) from India in the pre-war period. The war, however, witnessed the installation of smelting and refining capacity which, as mentioned previously in the report, is more than sufficient to meet the

requirements of the country in respect of both yellow metal and white metal alloys. In fact, the capacity has increased to such an extent that it is necessary, firstly to prohibit export of scrap from the country, and secondly to encourage import of scrap by removal of duty on scrap of all kinds. Although the refineries which were set up during wartime were not directly encouraged by Government, they received indirect support in the form of orders, especially from Ordnance factories and railways. The refineries also catered to the requirements of the general engineering industry in the country in the matter of alloys and castings. The Indian Copper Corporation which was started in 1924 converts, as mentioned previously, practically all its copper into brass which is again rolled into sheets and circles which will be considered in the chapter dealing with semi-manufactures. The quality of the alloys made in India is satisfactory, no complaints having been received either from railways or from the general engineering industry. The Indian requirement in respect of the yellow metal is estimated at 96,500 tons per annum (*vide* Appendix XI) whereas the Indian productive capacity is estimated at about 1,00,000 tons per annum (*vide* Appendix XII) and is likely to be raised to 1,30,000 tons in the near future with the installation of electric furnaces which are already on order. These figures are inclusive of 10,000 tons of brass manufactured by the Indian Copper Corporation. Before the war, the Indian requirements of yellow metal were about 37,000 tons per annum.

**Protection of the brass ingot industry.**

18. (1) Under article 70 of the Tariff Schedule, brass ingot is subject to a revenue *ad valorem* duty of 30 per cent. Recently Government announced removal of duty on brass scrap and brass ingot in pursuance of its general policy of making raw materials available to consuming industries at as low a cost as possible, but immediately there was a protest against this action by persons engaged in the secondary metal industry. The case was reviewed by the Commerce Department of the Government of India, and it was decided that, pending receipt of the report of the Tariff Board, the duty on brass ingot would remain. The present position, therefore, is that, while there is no duty on brass scrap, there is a 30 per cent. duty on brass ingot. In fact, considering that the case of the non-ferrous metals industry had been referred to the Tariff Board as long ago as November 1945, no action should have been taken to remove the duty on brass ingot without a previous reference to the Tariff Board. Some persons interested in the import of brass ingots forcibly complained that the action of Government in removing the duty in the first instance and reimposing it within a short period has created complications in regard to forward contracts entered into by them and the Board pointed out that this was a matter to be taken up by the persons concerned with Government and that it was not one on which the Board could be asked or induced to pronounce an opinion. The case of duty on brass ingot was considered by the Board particularly and at great length, opportunity having been given to the conflicting interests to state their views as fully and frankly as possible.

(2) The case for the removal of duty may be summed up as follows :—

(i) There is hardly any distinction between brass scrap and brass ingot and therefore both the materials should be treated alike ; if there is no duty on brass scrap, there should be no duty on brass ingot.

(ii) The refining industry is hardly an industry, the equipment used being indigenous, inexpensive and simple. The process of making brass ingot is also simple and one of the manufacturers stated that given duty-free scrap he could easily compete with duty-free imported ingot.

(iii) There is scarcity of scrap in the country with the result that it has to be imported, the import price being almost the same as the price at which readymade ingots could be imported : that being so, the country might as well import ingot in preference to scrap and save conversion charges to the consumers.

(iv) If there is a duty on brass ingot, the price of brass ingot will tend to rise, causing harm to the cottage workers who require brass ingots for the manufacture of hollow-wares used by the common people.

(v) If there is duty on brass ingot, (*a*) the local refining industry will scramble for all the available scrap, thereby squeezing out cottage workers who mainly depend upon this scrap by way of raw material for their products and (*b*) the price of scrap in the country will rise to the detriment of the Indian cottage workers.

(vi) Lastly, it was argued on behalf of those who advocated removal of duty on brass ingot that the quality of imported ingot was better than that of the locally manufactured ingot, and that any duty would be an additional burden on those who needed imported ingot for the manufacture of finished goods, such as cocks, taps, fittings and cast utensils.

(3) On the other hand, representatives of the brass ingot industry contended that all advanced countries had a refining industry and now that a refining industry had been established in the country due to the stress of war, it should be protected during the transition period and its expansion encouraged.

India is deficient in metals and should find means of utilising all available scrap rather than allowing it to be exported to countries where it would be refined and returned back to India in the forms of alloys and even ingots. The ingots produced by the Indian manufacturers would not prejudice the cottage workers who used brass scrap directly for the production of castings rather than ingots. Brass ingots mainly in bloom form are used for rolling rather than for castings by cottage workers and therefore the fear of the cottage workers that imposition of duty on brass ingot will affect their trade is far-fetched.

(4) After having heard the arguments advanced by both sides and having examined the pros and cons of the subject, the Board has come to the conclusion that the refining industry is an essential stage in the development of the non-ferrous metals industry in the country, and must therefore be assisted to survive in the transition period by the imposition of as low a protective duty as possible, it being clearly understood that the industry should be so organised in the meantime that it should be able to stand on its own legs at the end of the protection period, i.e.. without any duty.

(5) The Board examined the estimate of cost of production of brass ingots furnished by the Indian Non-ferrous Metals Manufacturers' Association. The Association's estimate is as follows :—

| | *Rs. per cwt.* |
|---|---|
| Scrap price .. .. .. | 47·50 |
| Burning loss at 5 per cent. .. .. .. | 2·40 |
| Manufacturing charges .. .. .. | 11·20 |
| Total .. | 61·10 |

The Board's estimate, arrived at after scrutiny of items of cost and taking into account the cost of the most efficient and economical units, is as follows :—

| | *Rs. per cwt.* |
|---|---|
| Scrap price .. .. .. | 45 |
| Burning loss .. .. .. | 2 |
| Manufacturing charges .. .. .. | 6 |
| | 53 |

(6) The landed cost ex-duty of brass ingot imported from U. K. which is the main source of supply is worked out as follows :—

| | *£. per ton.* | *Rs. per cwt.* |
|---|---|---|
| Brass (60 : 40) .. .. | 65 | 43 5 4 |
| Freight, insurance and clearing charges .. | 5 | 3 5 4 |
| Total landed cost .. | 70 | 46 10 8 |

(7) Brass ingots imported from U. K. are thus cheaper by Rs. 6-5-4 per cwt. (Rs. 53 minus Rs. 46-10-8 = Rs. 6-5-4), compared with the best cost of production in India. These figures suggest a duty of 13·6 per cent. (100 × 6·33 divided by 46·67).

(8) Regard being had to the possibility of a somewhat lower landed cost or a slightly higher cost of production than assumed by us, the Board recommends that a protective duty of 15 per cent. be levied to safeguard the home industry. The rate of duty should be adjusted under Section 4 of the Indian Tariff Act if the landed cost inclusive of duty tends to fall below Rs. 53 per cwt. This will mean a reduction by half of the existing revenue duty. This action will, while safeguarding the indigenous industry, meet the cottage workers half-way in allaying the fears referred to above. Brass ingot should be defined, in order to avoid importation of alloys other than brass ingots which may be subject to a higher customs duty, as follows :—

Brass ingot on analysis may be found to contain—

(*a*) copper 55 to 74 per cent.

(*b*) zinc 26 to 42 per cent., and

(*c*) components other than copper and zinc, including impurities, not to exceed 3 per cent. of which not more than one-half should be tin.

**Yellow metal alloys other than brass.**

19. We have included all the yellow metal alloys other than brass in one category for the purpose of protection. This category will include gun-metal, bronze, bell-metal and phosphor bronze. There are generally two types of gun-metal alloys, viz., (1) copper 88 per cent., tin 10 per cent., and zinc 2 per cent., and (2) copper 85 per cent., tin 5 per cent., zinc 5 per cent., and lead 5 per cent. Other yellow metal alloys, less commonly met with, have slightly different compositions as will be seen from the list of alloys given in Appendix XIII. The total requirements of

these alloys (i.e., yellow metal alloys other than brass) come to approximately 15,000 tons per year, for which there is ample productive capacity in the country. These alloys are used mainly by Railways and for general engineering castings. We have taken the cost of production and the landed cost of gun-metal as representative of this group of alloys. The estimated cost of production in India is as under :—

**Gun-metal**

| | *Composition* 88 : 10 : 2. | *Composition* 85 : 5 : 5 : 5. |
|---|---|---|
| | Rs. | Rs. |
| Raw materials .. | 93·80 (69·90) | 78·75 (63·00) |
| Freight, melting loss, manufacturing charges, etc. | 13·00 (10·00) | 12·50 (10·00) |
| Total .. | 106·80 (79·90) | 91·25 (73·00) |

*Note.*—The figures in brackets in the above table denote the estimated cost in the U.K. and before the receipt of the latest estimate.

We figured out the conversion charges of gun-metal in the U.K., and found them to be Rs. 10 per cwt. against Rs. 13 and Rs. 12·50 claimed by the Indian Non-ferrous Metals Manufacturers' Association and accepted by us. Since then, we are advised that prices have gone down and now the latest estimated landed cost ex-duty of gun-metal (composition 88 : 10 : 2) is Rs. 75 per cwt. whereas that of the gun-metal (composition 85 : 5 : 5 : 5) is Rs. 63 per cwt. We have adopted these latest estimates for the purpose of assessing the measure of protection required. In the case of the first gun-metal (composition 88 : 10 : 2), a duty of 40 per cent. will just bring the landed cost to Rs. 105 per cwt. as against the Indian cost of Rs. 106·80. In the case of the other type of gun-metal, a duty of 40 per cent. will raise the landed cost to Rs. 88·2 against the indigenous cost of Rs. 91·25. It will thus be seen that even a duty of 40 per cent. will fall short of the landed cost. This duty is necessary to give a chance to the local industry to survive. A little margin is left to the disadvantage of the home producer, which may be regarded as an incentive for improvement and reduction in cost. This duty of 40 per cent. should be a protective duty valid for three years in place of the existing revenue duty of 30 per cent. The higher Indian cost is due to the higher cost of raw materials in India, a factor over which the industry has no control. The principle of fair competition requires that this disparity should be made up by an import duty. We have endeavoured to keep the duty on gun-metal as low as possible in view of its use as bearings and as parts of machinery.

**White metal alloys.**

20. (1) The alloys of tin, lead, antimony and copper in varying proportions are known as white metal alloys. The most important alloys of this group are—

(*a*) Tin solders.

(*b*) Anti-friction white metals, and

(*c*) Type metals.

The total demand for these alloys is approximately 15,000 tons per annum whereas the productive capacity in the country is about 40,000 tons per annum (*vide*

Appendix XIV) indicating that the entire demand can be met from local production provided that the raw materials are made available and the alloy industry is protected against unfair competition from abroad.

(2) Tin solder is an alloy of tin and lead in varying proportions. The demand for this alloy in the country is 3,000 to 4,000 tons per year. The cost of production of Indian solder comes to Rs. 193·80 made up as follows :—

| | *Rs. per cwt.* |
|---|---|
| Raw materials .. .. | 180·80 (118·30) |
| Freight, melting loss and manufacturing charge. | 13·00 (11·70) |
| Total .. | 193·80 (130·00) |

*Note.*—Figures in brackets indicate the building-up of the U.K. cost before the receipt of the latest estimate.

Here again the latest estimates of landed cost are somewhat lower. The latest estimate of landed cost ex-duty of tin solder 50 : 50 comes to Rs. 120 per cwt. imported from U.K. We have adopted this figure for the purpose of measuring the required protection. There is at present a revenue duty of 30 per cent. The Non-ferrous Metals Manufacturers' Association has suggested a duty of 60 per cent. which will yield a landed cost of Rs. 192 per cwt., but the Board is not inclined to recommend a duty higher than 50 per cent. which should be sufficient, when the recommendation of the Board made elsewhere for removing the duty on tin is given effect to by Government and when the industry is developed so as to make reduction in costs of production possible. It should be mentioned that the cost of raw material has been calculated on the basis of the present price of tin, viz., Rs. 316-4-0 per cwt. We are told that the issue price of tin in the U.K., is Rs. 200 per cwt. The higher price in India cannot be accounted for by the duty of Rs. 375 per ton on tin in India. The bulk of the difference is really due to a lower price for issue of tin in the U.K. than the price at which India is able to obtain her requirements. It is not known whether the United Kingdom is subsidising the issue of tin, or whether the low price is due to the averaging of purchases made at different times and at different prices, but what matters is that the U.K. manufacturer of tin solder gets his raw material at a much lower price than it is possible for the Indian manufacturer. It has been calculated that, if the issue price in India were the same as in the U.K., then even the existing duty of 30 per cent. would be generous for the protection of the Indian producer. The alternative to the higher duty on tin solder in India is subsidisation of tin as in the U.K., but considering that our requirements of tin are comparatively small and that the incidence of solder and other white metal alloys on the cost of the job in which they are used is small, we prefer the protection of the Indian industry by means of an adequate duty to subsidisation of issue of tin. The duty should be protective and valid till the end of March 1950.

**Other white metals.**

21. In these alloys tin is the predominant constituent, being 90 per cent. in one alloy and 60 per cent. in another alloy. The total demand for these alloys comes to about 7,000 tons, which is amply covered by indigenous production capacity. The estimated landed cost ex-duty of 90 per cent. tin content white metal is Rs. 200 per cwt., whereas the estimated landed cost ex-duty of 60 per cent. tin

content white metal is Rs. 154 per cwt. The estimated cost of production of the same alloys in India is Rs. 318 and Rs. 250 per cwt., respectively. The conversion charges are small and over 90 per cent. of the cost is the price of raw materials, mainly tin. Here again, the disability of the Indian producer is the same as in the case of tin solder. Really speaking, a duty of 60 per cent. would be necessary to cover the indigenous cost of production, but, for the reasons given in respect of tin solder, we do not recommend a duty higher than 50 per cent., which we think should be sufficient to protect the indigenous industry. We are in favour of keeping this duty, as also the duty on gun-metal, as low as possible in view of its use in parts of machinery such as bearings. It must, however, be noted that the duty of 50 per cent. is recommended on the clear assumption that the duty on tin will be completely removed. The duty should be protective and valid till the end of March 1950.

**Type metals.**

22. Our recommendation in regard to tin solder and tin-base alloys should not apply to typemetal, which should be treated as a separate item in the Tariff Schedule. This metal is at present subject to a revenue duty of 30 per cent. The type metal is an alloy of lead, antimony and tin. If the duty on this alloy is raised, there is a danger that import of type metal may be substituted by import of types to the detriment of the indigenous type making industry. Types are required by the printing trade, and we think that it will be undesirable to raise the price of type. We have dealt with the case of antimony in a separate report, and we feel that, if action is taken as recommended by us, and the duty on tin is removed as suggested in this report, then the revenue duty of 30 per cent. on type metal may remain without risk to the indigenous type metal industry, but it should be protective in place of revenue.

**Mazak.**

23. Mazak is an alloy of zinc and aluminium in the proportion of 96 and 4. It is not produced in India, and we are told that it is not likely to be produced in India in the next few years. The alloy is used for die-casting. The total demand is estimated at 1,000 tons per year. During the war, mazak was used by some persons as zinc, which was an abuse of the alloy, but now that zinc is available freely, this abuse is unlikely. It was urged on behalf of the Non-ferrous Metals Manufacturers' Association and other interests present at the enquiry that, if mazak is permitted free of duty, the die-casting industry will receive a great stimulus, which will be all to the benefit of industrialization in India. When zinc is free of duty and mazak is 96 per cent. zinc, there can be no objection to the removal of duty on this alloy. The Board is impressed by these considerations and recommends that the duty on mazak be removed so long as it is not produced in India.

**Remaining alloys.**

24. Duty in respect of alloys not dealt with above should continue as at present, i.e., 30 per cent. *ad valorem*, but made protective. In this category will fall nickel silver, cupro-nickel, nickel alloys, etc. In fact, it is easier to catalogue the alloys which should be covered by a special duty, leaving the other alloys under an *ad valorem* protective duty of 30 per cent. The alloys to be treated specially are (*a*) brass ingot, 15 per cent., ; (*b*) gun-metal alloys, 40 per cent. ; (*c*) white metal alloys including tin solder, 50 per cent. ; and (*d*) mazak, free of duty.

## CHAPTER IV—SEMI-MANUFACTURES

**List of semi-manufactures.**

25. In this Chapter we deal with semi-manufactures such as sheets, circles, strips, rods, wires other than electrolytic copper wires used for cables and conductors, tubes, pipes, sections, etc.

**Development of rolling.**

26. The production of sheets and circles was developed mostly during the war except in the case of the Indian Copper Corporation which started its rolling operations in its Ghatsila Works in 1928. The stimulus for the sheet rolling mills came from the development of the secondary metal manufacturing and refining industry in India which provided the raw materials for the rolling mills. The industry is situated mainly in Calcutta and Bombay. Almost all the mills which have been set up recently were fabricated locally and have been working on a make-shift basis until they can be replaced by up-to-date mills from abroad with the removal of wartime import restrictions. The prominent pre-war producers of brass sheet are Devi Dayal & Sons, Bombay (1935) and General Metal Industries, Mirzapur (1938). Prominent among rolling mills established in wartime may be mentioned, (1) the India Rolling Mills, Calcutta, (2) the Binani Metal Works, Calcutta, (3) the Kamani Metals & Alloys, Bombay, and (4) the Metal Rolling Works, Bombay. Plans for installing modern and up-to-date plants have been made by (1) the Indian Copper Corporation, additional capacity of 10,000 tons, (2) Kamani Metals & Alloys—additional capacity 5,000 tons immediately and 15,000 tons later, (3) the Indian Smelting and Refining Co., Bombay—additional capacity 6,000 tons immediately with a further addition of 8,000 tons within a couple of years, (4) Devidayal & Sons, Bombay—additional capacity 6,000 tons and (5) Messrs. India Rolling Mills, Calcutta—additional capacity 8,000 to 10,000 tons. Other firms, such as Binanis, have also plans for additional rolling capacity. Over and above these organised sheet rolling mills, there are several small units scattered throughout the country, mostly in Bombay, Punjab, United Provinces, and Madras, working on a semi-cottage scale. Rods and bars are at present made by rolling and drawing, but at least one extrusion plant is likely to be established in the near future at Calcutta with a capacity to meet all the requirements of the country in this line. There is also an extrusion plant in the Katni Ordnance Factory which is now undertaking job work on behalf of civilian producers. Amongst main producers of rods and bars are (1) the India Rolling Mills, Calcutta, (2) the Binani Metal Works, Calcutta, (3) the Jaipur Metal Industries, Jaipur, (4) The National Screw and Wire Products, Calcutta, (5) Jayant Metal Manufacturing Company, Ltd., Bombay, and (6) Steel and General Mills Co., Ltd., Lahore. In so far as tubes and pipes are concerned there was no large-scale production in India before the war. This capacity has been developed during the war under the stimulus of the difficult shipping situation and the growth of demand created by the war. Tubes and pipes are made best and most economically by extrusion process. But as no extrusion plant was available, these articles were made by the cored-shell method by which tubes are drawn on a bench. The only known producer is the National Copper Tube Manufacturing Co., Karachi, although the firm of the National Pipes and Tubes Co., Ltd., Calcutta, has recently erected a plant for the manufacture of these products. The D. Waldie & Co., Calcutta, installed an extrusion press near Calcutta in the early years of the war for the production of lead pipes. The products of this press are up-to-date and according to standard specification.

As for the non-ferrous wires other than electrolytic copper wires used for cables and conductors, production was in existence in India prior to the war but on a cottage industry basis. Several factories have since installed equipment for the production of wires of brass and copper by mechanical process.

**Uses.**

27. Copper and yellow metal sheets, circles and strips are consumed in large quantities in India for the manufacture of utensils, stoves, sterilisers, etc. The utensil and hollow-ware-making industry is spread throughout the country the main centres being Bombay, Moradabad in United Provinces, Punjab and Madras. Rods are used in the engineering and electrical industries and are also required by railways, ordnance factories and the building trade. They are used in the manufacture of bolts, nuts rivets, screws, harness and saddlery goods, pipe fittings, door fittings and for arms and ammunition. They are also largely used in ship-building foundries and work-shops. Tubes and pipes are used for internal combustion engines, electrical heaters and other engineering purposes. Wires other than electrical are used in the engineering industry and for commercial purposes such as jari (gold thread borders). Wires are also used for making rivets and screws lead wire is used for electrical fuses and brass and copper wire for wire meshes.

**Quality.**

28. Brass sheets made by the Indian Copper Corporation are reported to be better than even imported sheets; but the same cannot be said of sheets made by the other rolling mills. For instance, it was complained that some of the sheets supplied by the rolling mills in India were not of uniform thickness and polish and were pitted. The size of the sheets made by the Indian Copper Corporation as also of the imported sheets is 4 feet × 4 feet which is the standard size; whereas the sheets made by the other Indian producers are usually 2 feet wide, the length being variable, the use of which involves higher wastage and is therefore, less economical to the hollow-ware industry.

**Arsenical copper rod.**

29. Arsenical copper rods are made from copper containing about 0·5 per cent. arsenic. They are generally used for boiler work, i.e., for making water space stays, etc. Before the war there was no manufacture of arsenical copper, rods in India, and for a long time it was considered doubtful if the industry could be established in India. The Jaipur Metal Industries, belonging to the Kamani group, have however successfully produced arsenical copper rods which have met the test of the Railway Board and the Defence Department. There is practically no other manufacturer of arsenical copper rods in the country. The demand for arsenical copper rods is approximately 500 tons a year, whereas the production capacity of the Jaipur Metal Industries for these rods is well over a thousand tons a year. It is stated on behalf of the Jaipur Metal Industries that they could meet the entire Indian demand provided that orders for the supply were placed with them. It was complained that although this production was established in wartime, and rendered useful service in time of emergency, supplies were being arranged from abroad as soon as the war ended and imports became easier. The Board has no reason to disbelieve this. Whatever may have been done in the past, it is desirable that the indigenous capacity is fully utilised before resort is had to imports unless the price difference is so very great as to justify such action.

**Demand and supply of semi-manufactures.**

30. The demand for copper and brass sheets, circles and strips is estimated at 40 to 50,000 tons per annum, whereas the demand for tubes and pipes is estimated at 1,000 tons per annum. The demand for brass and copper rods, other than black copper rods is 3,000 tons per annum while the demand for copper and brass wires is of the order of 2,000 tons a year. In so far as the production capacity is concerned, the position may be summed up as follows :—

| Items. | Annual demand. | Present capacity excluding small producers. | Estimated immediate additional capacity. |
|---|---|---|---|
| | (Tons) | (Tons) | (Tons) |
| (1) Sheets, circles and strips .. | 40-50,000 | 15,000 | 30,000 (likely addition after 2 years about 20,000). |
| (2) Pipes and tubes :— | | | |
| (a) Lead pipes .. | 700 | 1,000 | 4,500 |
| (b) Copper and brass tubes and pipes. | 1,000 | 100 | |
| (3) Rods .. | 3,000 | 5,000 | |
| (4) Wires .. | 2,000 | 4,000 | |

**Cost of production, cost of importation and measure of protection.**

31. (a) The cost of production of brass sheets as furnished by Messrs. Kamani Metals & Alloys, Ltd., is as follows :—

| | Per cwt. |
|---|---|
| | Rs. |
| Raw materials .. .. .. | 60·60 |
| Irrecoverable loss .. .. .. | 4·85 |
| Conversion charges .. .. .. | 36·55 |
| Interest on working capital .. .. .. | 2·11 |
| Distribution expenses .. .. .. | 5·09 |
| Average freight .. .. .. | 2·00 |
| Premium on prejudice and size discount .. | 5·00 |
| Obsolescence .. .. .. | 5·05 |
| Managing agent's commission .. .. | 0·62 |
| Profit on fixed capital .. .. .. | 6·32 |
| Total .. | 128·19 |

After discussion with the representatives of the industry, the Board has accepted the following estimate of cost of manufacture of brass sheets :—

| | *Per cwt.* | | | |
|---|---|---|---|---|
| | Rs. | a. | p. | |
| Cost of raw material .. .. | 60 | 10 | 0 | |
| Cost of conversion, including process losses | 35 | 0 | 0 | |
| Cost of packing .. .. | 1 | 0 | 0 | |
| Selling expenses .. .. | 2 | 8 | 0 | |
| Profit .. .. | 6 | 0 | 0 | |
| Total .. | 105 | 2 | 0 | |
| i.e. .. | 105 | 0 | 0 | per cwt. |

The Board agreed to allow Rs. 5 per cwt. for obsolescence, premium for prejudice and compensation for size discount. The total fair selling price according to the estimate of the Board would thus come to Rs. 110 per cwt. This is based on a production of 1,600 tons of brass sheets per annum. We examined the cost of production of brass sheets by the Indian Copper Corporation which is the only concern manufacturing sheets on a fairly large scale and on up-to-date lines. Its costs, however, do not offer a common basis for comparison with the rolling charges of the other manufacturers. The Indian Copper Corporation rolls only thick gauges up to 8 SWG. and its rolling cost comes to about Rs. 6 per cwt. In the case of the other rollers, we have calculated the cost of rolling of gauges up to 20 SWG. Besides this, the other factors to be kept in mind in making comparisons of costs are : (1) the Indian Copper Corporation was rolling as much as 10,000 tons per annum, while the smaller manufacturers were rolling only about 1,600 tons per annum, and (2) the Indian Copper Corporation has the advantage of long experience, better technical skill, efficient machinery, and the absorption of a major portion of the overheads by the mining department. Even after making allowance for all these factors, it is plain that the Indian rollers should bring down their costs considerably with the installation of up-to-date plant and machinery. The rolling costs of the Indian Copper Corporation give an indication of the extent to which rolling costs can be reduced. There is no reason why in course of time the other manufacturers should not attain the same level of technical efficiency as the Indian Copper Corporation.

(*b*) *Cost of importation.*—The cost of importation of brass sheets of average 20 SWG 4 ft. × 4 ft. is as follows :—

| | *Per cwt.* | | | |
|---|---|---|---|---|
| | Rs. | a. | p. | |
| C.i.f. Bombay .. .. | 84 | 3 | 0 | |
| Clearing and landing charges .. .. | 0 | 12 | 0 | |
| Landed cost ex-duty .. .. | 84 | 15 | 0 | |
| Duty at 30 per cent. on c.i.f. .. .. | 25 | 4 | 0 | |
| Landed cost inclusive of duty .. .. | 110 | 3 | 0 | |
| Fair selling price of the Indian manufacturer .. | 110 | 0 | 0 | per cwt. |
| Retail selling price (current) .. .. | 121 | 0 | 0 | |

It will thus be seen that the Indian producer is just covered by the existing 30 per cent. *ad valorem* revenue duty. He, however, entertains a genuine apprehension that if the duty is not raised, he will find it difficult to survive foreign competition, particularly in view of the prejudice against the Indian product. We have, of course, made some provision for this prejudice in the calculation of the fair selling price; but this is not regarded as sufficient by the industry. Considering that the industry is comparatively new, that it is working with make-shift equipment the bulk of which will have to be scrapped and replaced by modern machinery, that it has made plans for more scientific and economical rolling and that the allowance for obsolescence is on the conservative side, a small cushion is necessary during the initial period of say 3 years. The Board therefore recommends that the duty be raised from 30 to 35 per cent., that it should be a protective duty, that it should be valid for the period ending 31st March 1950, and that provision should be made for the adjustment of duty so as to maintain the tariff value of imported brass sheets of 4 ft. × 4 ft. average 20 SWG assumed by us in this report. It will be observed that we have effected a drastic cut in the estimate of cost of production furnished by the industry as we feel that in brass, which is the poor man's metal, the price should be kept as low as possible. With the protection now proposed the industry will expand so as to introduce internal competition which will eventually result in lower prices to the benefit for the ordinary consumer. As in the case of brass ingot, so also in the case of brass sheets, we wish to stress that this protection is intended only for the transitional period of 3 years and that the industry should from now take steps to so organise itself as to dispense with the need for protective duties and special forms of assistance at the end of this period. The same duty, i.e., 35 per cent. protective, should apply to copper sheets, although it may be pointed out that there is very little copper rolling in the country.

**Zinc sheets ; Lead sheets.**

(*c*) In the preceding paragraph we considered the case of brass sheets. Zinc sheets are covered by item No. 68 in the Tariff Schedule and are subject to a revenue duty of 30 per cent. *ad valorem.* Similarly, lead sheets are governed by item No. 67 for which also there is a 30 per cent. *ad valorem* duty. We have considered whether the duty on these items should remain the same or be raised or reduced. There is no case for increase in duty inasmuch as neither of these products is at present made on any large scale in India. As for reduction, we feel that as these articles are required essentially for other industries, it would be in conformity with the policy generally pursued by Government if the duty is reduced to the lowest possible level. Zinc sheets are required for process blocks and photo-plates, whereas lead sheets are required in the chemical industries. We think that a 20 per cent. duty should be sufficient in respect of both these articles. The duty should be protective in place of revenue and *ad valorem* as at present.

**Rods.**

32. Production of brass rods in the country is small and we have not been able to collect data to judge whether the present duty is sufficient or needs modification. We have, however, gathered data on arsenical copper rods, which are being made by the Jaipur Metal Industries, Limited. The estimated cost of production of arsenical copper rods, in India, as accepted by us, is as follows :—

| | *Per cwt.*<br>Rs. |
|---|---|
| Raw materials including losses .. .. | 73 (77·7) |
| Cost of conversion including interest and profit .. | 53 (89·1) |
| Total .. | 126 (166·8) |

*Note.*—The figures in brackets are the ones given by the producer as their actual cost, but it may be added that they were agreeable to reduce their cost to Rs. 150 per cwt.

The landed cost of arsenical copper rods is reported to be Rs. 95 per cwt. exclusive of duty or Rs. 129·2 per cwt. inclusive of 36 per cent. standard duty and Rs. 117·8 inclusive of the preferential duty of 24 per cent. Comparing the cost of production with the landed cost ex-duty, a duty of 33 per cent. is indicated, but in our opinion a duty of 35 per cent. should be necessary to carry a sense of security and stability to the industry coupled with the assurance that all demands for arsenical copper rods by Government would be placed in the first instance on the Indian producer. The duty should be protective and to remain in force till the end of March 1950. The same duty should apply to brass rods, there being no reason for making any distinction between copper rods and rods of other metals. It may be mentioned here that we have dealt with the case of electrolytic copper rods separately as that is the raw material for the electric wires and cables industry and is little used by other consumers.

**Tubes, pipes and wires.**

33. No demand has been made on behalf of producers of tubes, pipes and sections other than rods, for any modification in the present revenue duty which is 36 per cent. (standard) in the case of tubes and pipes made of copper, and 30 per cent. in the case of those made of brass and lead. A protective duty of 35 per cent. has been proposed by the Board for the semi-manufactures of copper ; the same will apply in the case of tubes and pipes made of copper, while the duty on those made of brass and lead will continue to be 30 per cent. but it should be protective in place of revenue. The latter, i.e., brass and lead tubes and pipes are included in item No. 70 (2) proposed by us in the Tariff Schedule, *vide* Appendix No. XVI. The duty on brass wires is 30 per cent., *vide* item 70 in the Tariff Schedule ; this duty on brass wires should be raised from 30 per cent. to 35 per cent. so as to bring it into line with the duty on brass rods and it should be made a protective one to remain in force for the period ending the 31st March 1950. The case of the copper wires and cables is considered separately later in this report.

# CHAPTER V—MANUFACTURES OTHER THAN WIRES AND CABLES

**List of items dealt with.**

34. In this chapter, we deal with manufactured articles, such as, steam and sanitary fittings, building fittings and hollow-ware castings.

**Progress of industry.**

35. Application for protection of the steam and sanitary fittings industry was made by Messrs. Bombay Brass Works, Jullunder City, who asked for protection of their manufacture of brass and gun-metal and cast-iron water and sanitary fittings. Similar applications were also received from certain other producers such as (1) Gujranwala Metal Works, Gujranwala, Punjab, (2) Annapurna Metal Works, Calcutta, (3) Ashok Manufacturing Company, Lahore, and (4) Govardan Das P. A., Jullunder City. Our questionnaire was issued to these producers as also to certain other producers whose names came to the knowledge of the Board. At the public inquiry, the case of this industry was presented by representatives of the Bombay Brass Works, Jullunder, and the Ashok Manufacturing Company, Lahore. It was said on behalf of the industry that over 3,000 people were employed in the industry, that the industry was developed in war time and that it was now in a position to supply all the Indian demand. The demand is of the order of 3,000 to 4,000 tons of fittings connected with water supply, valued at approximately Rs. 75 lakhs. Of the pre-war manufacturers who were working mostly on a cottage industry scale, mention may be made of two producers, viz., Messrs. Govardhandas P. A. who have a well-equipped factory at Jullunder City, Punjab, and who have been manufacturing steam and water fittings of all specifications since 1907. The products turned out by this industry include general fittings such as taps and cocks and bathroom equipments. The industry also makes articles used in large quantities in workshops for water and steam connections and in boilers for steam mountings. The main consumers of these products are the railways, the public works departments of Government and municipal councils and corporations. The raw materials used by the industry are brass and gun-metal ingots and sheets, scrap of these metals and brass wire netting. Tin and mild steel rods are the other raw materials required by the industry.

**Demand, supply and protection.**

36. It has not been possible for us to gather data of imports of these fittings as they are not shown separately in the seaborne trade accounts. There is no separate classification for sanitary fittings in the customs schedule with the result that these articles fall under item 70—brass, bronze and similar alloys, rods and manufactures thereof, not otherwise specified, the duty leviable being 30 per cent. *ad valorem*. In ascertaining the cost of production in India, the Board was handicapped because none of the applicant firms filled in the prescribed forms or could give reliable cost data, also because these fittings covered a wide range of articles for which individual cost accounting would have been difficult. Speaking generally, however, the representatives of the industry admitted that their cost of production and fair selling price were below landed costs of the same articles and therefore they were covered for the present. The sense of security should be still greater when the duty on tin is removed as recommended in this report. The only factor which has to be taken into consideration is the prejudice against the Indian product, but the industry is fairly well established so as to enjoy a reputation comparable to foreign imports. As we

have recommended a duty of 35 per cent. on semi-manufactures such as sheets and strips, it would be anomalous to have a lower duty on the manufactured goods. We, therefore, recommend that the duty on manufactured articles such as steam, sanitary and other fittings should be raised from 30 to 35 per cent. so as to bring it into level with the duty on semi-manufactures. It should be a protective duty valid for the period ending March 1950. It is to be hoped that with this added cushion, supplemented by the removal of duty on scrap and reduction in duty on ingot, the local industry will expand so as to meet the growing demands likely to arise out of the increased constructional activities expected to take place in the country in the course of the next three years.

The industry asked for the concession of the removal of import duty on plant and machinery that may be imported for the manufacture of fittings in the country. But this is a general question which will be taken up for the industry as a whole later in the report.

The hollow-ware industry is well established in the country and is not afraid of competition from abroad. No special action is therefore necessary in regard to these articles.

## CHAPTER VI—MANUFACTURES—ELECTROLYTIC COPPER RODS, WIRES AND CABLES

**History of the industry.**

37. In this chapter we deal with the cable industry as a whole. The industry is really divided into two parts, viz., production of black copper rods and manufacture of wires and cables. The manufacture of wires and cables came first in the development of the industry whereas the production of black copper rods was started for the first time in wartime. Before the war, there was only one factory producing wires and cables, viz., the Indian Cable Company at Tatanagar. Since then, another concern has come into existence, viz., the National Insulated Cable Company which has its factory at Calcutta. The production of rods is undertaken by only one firm in Calcutta, viz., the National Rolling Mills, which is really an associate concern of the National Insulated Cable Company. The Indian Cable Company, which was formed in 1920 and which was the only one of its kind in India until the establishment of the National Insulated Cable Company, is a rupee company, registered in India. It applied twice in the past for protection. In its first report, issued in 1928, the Tariff Board had recommended that (1) the duty on electrolytic copper rod known as black rods, be removed and (2) a duty of 5 per cent. should be levied on the thinner rubber-insulated wires and cables which were till then being imported duty-free. The first recommendation was merely a confirmation of the concession which the Company had enjoyed ever since it started making cables in India. In its second report issued in 1931, the Tariff Board rejected the claim of the Indian Cable Company for further protection on the ground that the manufacture of electric wires and cables was not an industry which satisfied the Fiscal Commission's first condition requiring (*a*) the availability of raw materials in the country and (*b*) enjoyment of natural advantages. On the present occasion, the Indian Cable Company did not appear in support of the application of the other factory for protection presumably because the Company is so well established as to be able to carry on its production without fear of competition from abroad. In fact, the representative of the

Indian Cable Company, Mr. Mackintosh, who appeared before the Board to oppose the application of the National Rolling Mills for protection to the local rod rolling industry, did not attend when the Board took up the case of wires and cables, although the Board had asked him to remain present and assist it and had fixed the time of the meeting to suit his convenience. Mr. Mackintosh's conduct was discourteous and objectionable, the more so when it is realised that he represented a concern that had twice in the past solicited the support of the Tariff Board and had benefited thereby. In so far as the production of black rods is concerned, the National Rolling Mills have applied for a protective duty and the application is opposed by the Indian Cable Company which has hitherto been enjoying the concession of the import of copper rods free of duty.

**Raw materials.**

38. The raw material for the black copper rod industry is electrolytic wire bar (E. W. bar) which is not produced in India and which is unlikely to be produced in India in the near future owing to the unsuitability of Indian copper for the electrolytic process. The chief raw material for the wire and cable industry is the electrolytic copper rod, or black copper rod as it is sometimes called, the other raw materials being rubber and lead for insulation, tin for tinning and cotton and silk for braiding.

**Process.**

39. The process of rod rolling is simple. Electrolytical copper wire bars are first heated in a furnace to a specified temperature, then taken through passes in the roughing train and finally passed through the finishing train. Through each pass, the sectional area is reduced until in the last pass the required finishing diameter of rod is obtained. Rod emerging from the last set of rolls is coiled by an automatic coiler and is ready for delivery. The manufacture of electric wires and cables falls generally into two parts, viz., the drawing of the wire and the insulation of the cable. The copper rod is first annealed and pickled in a weak solution of sulphuric acid to remove surface oxidation and then passed through a series of wire drawing dies until the final size of wire as required is obtained. Wires that are to be insulated are again annealed and run through a bath of molten tin before being subjected to rubber insulation. The rolling mills as well as both the cable factories are up-to-date units of production and adopt the latest methods of manufacture. The machinery of the National Rolling Mills and the National Insulated Cable Company was obtained with the active assistance of Government, which was helped in this matter by the U.K. Ministry of Supply.

**Demand and capacity.**

40. (*a*) The demand for electrolytic black copper rods is roughly 10,000 tons, depending upon the demand for wires and cables. For 10,000 tons of black copper rods, 10,400 tons of E. W. bars will be required. Both the Indian Cable and the National Insulated Cable require equal quantities of black copper rods. The capacity of the National Rolling Mills is reported to be 30,000 tons per annum working on three shifts and 10,000 tons per annum working on a single shift. The actual production has been something like 600 to 625 tons per month working single shift owing to paucity of raw materials. During the war, the Indian Cable Company produced annually as much as 10,000 tons of copper wires drawn for all purposes, but in the next three years, production is not expected at the same level, notwithstanding schemes of hydro-electric and other developments. It is expected

to fall to something like 5,000 to 6,000 tons per annum. However, even if the Indian Cable Company required as much as 10,000 tons of copper rods and an equal quantity was required by the National Insulated Cable, the total demand could be met by the National Rolling Mills which have as mentioned above installed capacity of nearly 30,000 tons per annum, going all out. It may therefore be taken that there is complete rod rolling capacity in the country.

(*b*) As for wires and cables, the position regarding demand, capacity and actual maximum production is given in the table below :—

| Name of article. | Demand. | Capacity. | Actual maximum production per annum. |
|---|---|---|---|
| 1. Bare copper wires .. | 10,000 tons .. | 24,000 tons .. | 6,600 tons per annum. |
| 2. Rubber insulated electric cables (VIR cables). | 50 million yards . | 40 million yards .. | 14 million yards. |
| 3. Winding wires cotton covered | 200 tons .. | 300 tons .. | 250 tons. |
| 4. Enamelled wires .. | Not known .. | Nil .. | Nil. |
| 5. Paper insulated cables .. | Do. .. | Do. .. | Do. |
| 6. Cambric cables .. | Do. .. | Do. .. | Do. |

**Quality.**

41. As regards the quality of black copper rods produced by the National Rolling Mills, there is a difference of opinion between the two consumers, namely, the Indian Cable Company and the National Insulated Cable Company. The Indian Cable Company, which had to use the rods produced by the National Rolling Mills on account of the embargo placed by Government on the import of rods on the establishment of rod production in India, has stated that these rods are (1) slightly harder than is desirable, (2) slightly spilly throughout, thus rendering them unsuitable for the production of tinned copper wires for electric cables, and (3) not sufficiently long for the manufacture of trolley wires weighing about 350 lbs. The National Insulated Cable Company, which is an associate of the National Rolling Mills, and which uses the same rods, has no complaints to make and its representative pointed out that some of these defects were noticed in the earlier productions but subsequently they have disappeared and that rejections on account of these faults have progressively declined. The representative of the National Rolling Mills, the producer of rods, also admitted that some of the rods produced by them were spilly in the beginning, but that, with more experience and improved technique, these defects are being gradually overcome. He has quoted figures showing the fall of rejections from 7 per cent. in the early days to only 1 per cent. latterly. This decrease in the percentage of rejections has not been disputed by the representative of the Indian Cable Company. Furthermore, the National Rolling Mills are now in the process of installing high-powered motors as also a second stand in the roughing train which, when in operation, will increase

the speed of rolling, thereby minimising spills. Secondly, with the installation of new motors, it will be possible for the National Rolling Mills to produce rods suitable for drawing trolley wires of 350 lbs., provided of course the mills get electrolytic wire bars of proportionate weight. The Board is satisfied that the quality of the rods produced by the National Rolling Mills has improved steadily and that in any case, there should be no ground for complaint against indigenous rods in future. In so far as wires, cables and conductors are concerned, no complaint was received from any of the consumers against Indian products and, on the other hand, evidence has been adduced by the producers to show that satisfaction has been expressed by numerous consumers on various occasions. It may, therefore, be presumed that the quality of these articles is also satisfactory.

**Cost of production, landed cost, and measure of protection.**

42. (1) The accounts of the National Rolling Mills were examined by our Cost Accounts Officer at great length and a table of cost of production has been prepared giving what it should be under optimum conditions. This statement as finally accepted by the Board, is given in Appendix XV. It will be seen from the statement that the fair selling price made up of the cost of production and legitimate profit of the producer comes to Rs. 1,469 per ton of black copper rod, based on a production of 10,000 tons per annum.

(2) Information regarding the landed cost of imported black copper rods coming from the U.K. and Canada is not directly available, there being no recent imports. We have, however, built up the landed cost of U.K. black copper rod by taking the estimated landed cost of electrolytic wire bars, and adding thereto the estimated cost of conversion based on the difference in the latest prices of electrolytic wire bars and black copper rods in the U.K. Though electrolytic wire bars are not being exported from the U.K., we have been told that the latest quotation would work out at Rs. 1,181 per ton landed Indian port. To this should be added Rs. 67 per ton being the estimated conversion cost of the bar into rods. The estimated landed cost of U.K. black copper rods would thus work out to Rs. 1,248 per ton exclusive of duty. As the import of rods from U.K. is cheaper than imports from Canada, the landed cost of electrolytic wire bars imported from Canada alone being Rs. 1,332 per ton, we have adopted the estimated landed cost of the U.K. rods for assessing the measure of protection required for the Indian industry.

(3) The fair selling price of indigenous black copper rods (as given in Appendix XV) is Rs. 1,469 per ton based on the price of Canadian electrolytic wire bars, which alone are available to the Indian industry. The difference between the fair selling price and the estimated landed cost ex-duty comes to Rs. 221 (Rs. 1,469—Rs. 1,248). The difference would be bridged by a duty of 17·7 per cent. on c.i.f. Calcutta and indicate the measure of protection required for the safeguarding of the Indian industry. We, however, recommend a protective duty of 20 per cent., to remain in force till the end of March 1950, for the following reasons. Firstly, we have assumed a production of 10,000 tons whereas the rolling mills have not yet exceeded 6,000 tons per year and it is not certain whether the full, single shift capacity of 10,000 tons will be reached owing to the difficulty of procuring the requisite amount of electrolytic wire bars. Secondly, the new motors are yet to be installed and their efficiency and effect on cost of production yet to be proved. Thirdly, there is reason to apprehend that if the price difference

between the imported and the Indian rods were to be unduly narrow, the Indian Cable Company may rather use imported rods than indigenous rods. Lastly, supply of electrolytic wire bars is controlled by the group of industries abroad which would rather export rods than electrolytic wire bars. All these considerations demand that the protection should be effective, with a small margin in favour of the Indian producer. We, therefore, think that a protective duty of 20 per cent. to remain in force till the end of March 1950 is necessary to safeguard the Indian rod rolling industry, and recommend that action be taken to impose the duty accordingly. Simultaneously with the imposition of duty, the present embargo on import of black copper rods should be lifted, so that the production of wires and cables may not suffer and the quality of production of the National Rolling Mills may be kept at the highest possible level. When this duty is imposed, the concession given to the cable manufacturers to import black copper rods free of duty must disappear. In this connection it may be pointed out that when the Tariff Board in 1928 recommended removal of duty on black copper rods, it envisaged reimposition of duty on the rod industry being established in India. There should be a separate item in the Tariff Schedule for black copper rods which generally come in the form of coils. This is necessary to avoid import of ordinary copper rods in the name of black copper rods which will be subject to a lower (20 per cent.) rate of duty.

(4) This paragraph deals with hard drawn bare copper wires or conductors, and stranded wires. At present the duty on these goods is governed by item No. 72 (*e*) of the Customs Tariff Schedule which, as it stands, covers (*a*) bare copper wires, (*b*) paper insulated cables, and (*c*) A.C.S.R. (aluminium conductors steel re-inforced). The duty is 10 per cent. *ad valorem* revenue. This item will have to be split up in view of the fact that, while there is adequate capacity in the country for bare copper wires, there is no capacity for paper insulated cables which would still have to be imported and on which therefore a lower duty would be reasonable. Bare copper wires are also included in item 73 (1) which will have to be recast when the commodity is put in under a separate item, namely, 72 (*f*), which will be only for bare hard drawn or annealed electrolytic copper wires and cables of all sizes designed as parts of a transmission system. The duty on bare hard drawn or annealed electrolytic copper wires will have to be raised from the present figure of 10 per cent. to a higher figure in view of two facts, namely, (1) there is more capacity for them than there is demand in the country, and (2) a duty of 20 per cent. will be imposed on black copper rods if our recommendation in this behalf is accepted by Government. If the duty is not raised, the danger would be that black copper rods might be imported under the title of wires, thus escaping a part of the duty and secondly, the cable companies may import rods in the name or form of wires and either sell the same or make smaller conductors thus not using the rods made by the National Rolling Mills in India. The duty to be imposed on these wires should be the 20 per cent. duty proposed to be levied on copper rods plus the 10 per cent. duty that was given as a preference in favour of the Indian producer in the existing Tariff Schedule, that is, a total of 30 per cent. For the present, the third type of wire included in item No. 72 (*e*) namely, A.C.S.R., will go with the bare hard drawn or annealed electrolytic copper wires and cables of all sizes, for which a separate item 72 (*f*) has now been proposed. To remove ambiguity, the reference to bare copper wires occurring in item No. 73 (1) should be removed, so that bare copper wires will be governed by only one item, namely, 72 (*f*). The revised item No. 73 (1) will then read as follows and be subject to the existing duty.

"Electrical Control Gear and Transmission Gear, namely, switches (excluding switch boards fuses and current breaking devices of all sorts and descriptions, designed for use in circuits of less than ten amperes and at a pressure not exceeding 250 volts, and regulators for use with motors designed to consume less than 187 watts, insulated copper wires and cables, any one core of which, not being one specially designed as a pilot core, has a sectional area of less than one eightieth part of a square inch, and wires and cables of other metals of not more than equivalent conductivity : line insulators, including also cleats, connectors, leading-in-tubes and the like, of types and sizes such as are ordinarily used in connection with the transmission of power for other than industrial purposes, and the fittings thereof but excluding electrical earthen-ware and porcelain otherwise specified."

(5) Production of rubber insulated cables is still in its initial stage in the National Insulated Cable Company, which therefore, withdrew the demand for a revision of the tariff on such cables. These cables are governed for purposes of tariff by item No. 73 (6), according to which there is an *ad valorem* revenue duty of 7½ per cent. The tariff may remain at 7½ per cent. revenue as at present. The wording of the item also requires no modification. It is possible that the Company may come up for revision a little later when more experience has been gained and data are available as to the cost of production and competitive capacity.

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## CHAPTER VII—GENERAL

**Eligibility for protection.**

43. In the previous chapters, we have recommended imposition of protective duties for the safeguarding of the following industries :—

(1) brass ingot ;

(2) yellow metal alloys ;

(3) white metal alloys ;

(4) brass sheets, circles, and rods ;

(5) arsenical copper rods ; and

(6) electrolytic copper rods and wires.

We have also recommended removal of duty on nickel, tin and other metals like cobalt, chromium, tungsten and magnesium, as also on scraps of these metals. We have recommended that the removal of duty on copper unwrought, copper scrap, brass scrap, lead ingot, lead scrap, zinc ingot and zinc scrap should be confirmed. We have also suggested a few alterations in certain revenue duties, e.g., bare electric copper wires (the duty to be raised from 10 per cent. to 30 per cent. to be protective), certain non-ferrous manufactures (duty to go up from 30 to 35 per cent.), and zinc and lead sheets (duty to be reduced from 30 per cent. to 20 per cent.). We have satisfied ourselves that the non-ferrous metals industry in India, such as it is, is eligible for these concessions and privileges. The industry, though comparatively new, has established itself on a firm footing, taking advantage of the wartime conditions, and only requires help during the transition period to consolidate the progress achieved so far and to be established so as to face the future with confidence. We have explained, while dealing with specific matters, e.g., black copper rods and electrical cables and wires, that the machinery installed is modern and up-to-date and that the promoters of the industry have taken every care to see that production is carried on efficiently and economically. While dealing with brass ingots and brass rolling industry, we explained that the industry had to carry on with improvised machinery but that plans had already been made and indeed were well in an advanced stage for replacement of existing machinery by more up-to-date and efficient plant which when installed would enable costs to be reduced thereby increasing the competitive capacity of the Indian industry. On the whole, therefore, we have no hesitation in saying that the industry is run on sound business lines there by satisfying the first of the two conditions prescribed by Government for eligibility for protection. In so far as raw materials, markets and natural advantages are concerned, the industry is in a better position than similar industries developed in other countries. If copper rod rolling and wires and cable industry could be established in England which has to import all its copper requirements, there is no reason why the absence of copper in India in sufficient quantities should be regarded as a disqualification for these industries. From the point of view of market, national interests and importance of the industry, the industries referred to in this report deserve protection as was amply demonstrated by the experience of the war just concluded. As for the development so as to be able to carry on successfully without protection or State assistance, we have shown that the industry is already on the verge of being self-supporting and that, after a period of three years, it should be able to dispense with most of the protection now proposed. Both the conditions prescribed have, therefore, been fulfilled and there is full justification for the proposals for protection and assistance embodied in this report.

**Duration of protection.**

44. Wherever we have recommended protection, it is for the period ending March 1950. By the terms of our reference, we are precluded from recommending protection for a period exceeding three years, but we have suggested the end of March 1950 for purposes of administrative convenience, intending that the period of protection should coincide with the financial year.

**Nature of duty.**

45. We have recommended conversion of revenue into protective duty in most cases, as the non-ferrous metals industry has to be treated as a whole and it would be unwise to have most duties protective and a few duties revenue. Revenue duties are more liable to fluctuations which might have the effect of up-setting the balance between the different stages of production which are closely interlinked.

**Burden of protection.**

46. Increases in duties proposed by us have not been numerous or substantial. We have not mentioned in the report details regarding the burden of incidence in each case, but this should not imply that any recommendation has been made without adequate examination of this aspect. In the case of brass sheets for instance, in which the common man is most interested, sheets being the raw material for the utensil-making industry, increase in duty from 30 per cent. to 35 per cent. will raise the price of brass utensils by less than one anna per lb. Assuming that an ordinary family purchases brass utensils of the weight of 8 lbs. per year, which is really a liberal estimate, the burden of extra duty will work out less than 8 annas per year per family. This burden will have to be borne only for

a period of three years after which the extra duty should disappear and the burden should not be above the original limit. It should decline progressively consequent on the development of the industry on a firm basis. Taking again the case of electric wires and cables, we find that in a town electrification scheme costing Rs. 10 lakhs, the cost of bare copper wires and cables would be approximately Rs. 1 lakh. The duty on this material will be raised from 10 per cent. to 30 per cent. involving an extra cost of Rs. 20,000. Spread over the total cost of electrification, i.e., Rs. 10 lakhs, the extra burden amounts to 2 per cent. Even so, it may be regarded as somewhat high, but then one has to take into account the fact that if there is no local industry, there will be no competition and there will be no guarantee that imports will be made at minimum prices and not at prices that will be dictated by the foreign producer or by the importer. On the other hand, mention may also be made of the proposed reduction of duty on brass ingot from 30 per cent. to 15 per cent., the benefit of which will go mainly to cottage industries and users of hand-made utensils, castings and sanitary fittings.

**Removal of import restrictions.**

47. When effect is given to our recommendations for protection and assistance to the non-ferrous metals industry, it will not be necessary to continue any longer existing restrictions on import of non-ferrous metals, ores, scrap, semi-manufactures and manufactures. These restrictions should therefore be removed. So long as the indigenous industry is assured of protection against unfair competition by means of an adequate tariff, inflow of imports is not only in the interests of the country as a whole but even of the industry itself. The country is deficient in metals and should welcome import of non-ferrous goods in any shape or form. Import of semi-manufactures and manufactures of good quality will keep the local industry up to standard as with price equalisation, quality will be the determining factor in the competition between Indian and imported products.

**Ban on export of scraps and removal of duty on scrap.**

48. India is deficient in non-ferrous metals and has to import the bulk of her requirements. For a considerable time, India will have to import large quantities of copper, brass, lead, tin, zinc and nickel, to mention the more important non-ferrous metals. That being the position, every action should be taken, firstly to conserve scrap, and secondly to attract scrap from abroad. For conservation of scrap, there should be a ban on export of scrap of all non-ferrous metals and alloys. Similarly, duty on scrap of all non-ferrous metals and alloys should be removed so that import of scrap may be easier and cheaper providing raw material to the Indian smelting and secondary metal industry.

**Refund of duty on machinery imported for development of non-ferrous metals industry.**

49. A number of persons who appeared at the inquiry requested that duty on import of machinery ordered, or which may be ordered, for the expansion and development of the non-ferrous metals industry in the country should be removed. We have referred in the body of our report to the plans made by several concerns for installing new capital machinery, especially for the manufacture of lead ingots, and production of sheets and circles. A number of concerns are importing rolling mills and extrusion plants from abroad. One concern, namely, the Indian Standard Metal Co., Bombay, had imported a dry rectifier plant from the U. S. A., and paid a duty of 36 per cent. under protest.

As these mills and machinery cannot be manufactured in the country, and as they have to be purchased from abroad at the present inflated costs, it is desirable that the initial capital expenditure should be reduced to the minimum, and overcapitalisation with all the consequential legacy of high costs of production avoided. The desired relief could be extended by giving a refund of duty on machinery which is at present 10 per cent. The refund should be given on all machinery imported for the expansion and reorganisation of the non-ferrous metals industry since the case of the industry was referred to the Board, that is the 3rd of November 1945. Similar recommendations have been made in the other cases which have come before the Board.

**Government to take an active hand in prospecting and proving of ores.**

50. Considering the deficiency of India in the non-ferrous metals, a more vigorous policy on the part of the Central Government in the matter of prospecting and proving of ore reserves is called for. Apparently, the Geological Survey of India has so far confined its activities to the mapping of areas and possible location of minerals, but there has been no detailed prospecting, much less proving of the ores. During our inquiry, representatives of the industry laid great stress on the desirability of Government giving active assistance in the proving of ores capable of commercial exploitation and we feel that this request is reasonable and should be most sympathetically considered by Government. We would particularly refer to the case of copper, lead, zinc and tin. There should also be some laboratory where ores could be analysed to enable results to be published for the information of prospective industrialists. The Central Government will shortly be setting up a Metallurgical Institute at Jamshedpur and it would be desirable to have a full-fledged non-ferrous section in the Institute with facilities for pilot plants where concentration of ores and extraction of metals from ores or concentrates may be experimented upon and results obtained suitable for commercial use. While the industry should have its own laboratories for investigating the *ad hoc* problems, Government laboratories should afford facilities for long-range researches common to the industry as a whole.

**Provision for trained technical personnel.**

51. As the non-ferrous metals industry has started in India only recently, it lacks in suitable technical personnel with experience of modern metallurgical plants and appliances. Government should, therefore, arrange for the training of technically qualified persons for the industry abroad to ensure a speedy and healthy growth of the industry. We would also impress upon the industry the need to employ an adequate number of qualified technicians and to have at least one technically qualified Director on the Board of Management.

**Government to build up stock piles of essential metals or ores.**

52. Another action which Government ought to take in view of our deficient supply of essential non-ferrous metals is either to purchase metals or suitable ores in the world market and build up a stock pile in the country, as also to assist private industrialists in making purchases at concession prices based on bulk orders negotiated by or through Government. There is reason to believe that other countries, particularly the U. S. A. and the U. K., are following this policy and building up piles of essential metals from which releases are made to industries as and when occasion arises,

We feel that, if similar action is taken in this country, not only will the stock position improve, but our industries will be assured of steady supplies thereby enabling them to reduce their costs of production and to face world competition with greater confidence and with less dependence upon protective duties, the benefit of which will pass ultimately to the consumer. This is primarily a planning matter, but we have referred to it as it has also a bearing on the cost of production and the need for and duration of protection.

**Disposals.**

53. It was urged by the representatives of the non-ferrous metals industry at the inquiry that the disposal of non-ferrous metals by the Disposals Directorate of the Department of Industries and Supplies left something to be desired. Trade did not know what quantities were available for disposal and the prices sought to be obtained were in many cases unremunerative. A distinction was drawn between the practice followed in India and the policy pursued in other countries, especially U.K. where non-ferrous scrap was made available to consuming industries at controlled rates and not at exorbitant prices likely to be obtained when goods are put to auction in a scarcity market. We suggest that the practice followed in this regard, in the other countries may be ascertained and that in any case representatives of the non-ferrous industry, including the cottage industry, should be taken into confidence in the disposal of non-ferrous metals scrap with a view primarily to make the best possible use of the scrap in the interests of the non-ferrous industry in the country. It was further suggested in this connection that the Officer in charge of development of non-ferrous metals in the Department should be associated with the disposal of non-ferrous scrap ; the suggestion appears to us to be sound and is commended for consideration.

**Incursion of foreign interests.**

54. Another point which was mentioned at the public inquiry and to which we are inclined to make a reference in this report is that, with the removal of duty on primary metals, there may be a tendency on the part of foreign capitalists to set up plants for the production of alloys and other non-ferrous articles in India. This again is essentially a matter for planning, but we draw the attention of Government to this matter in order that a watchful eye may be kept with a view to checking any such tendency.

**Comparison of duties in India and Australia.**

55. It may perhaps be of interest to draw a comparison between the tariffs prevailing in a country such as Australia, which, like India, is still engaged in building up its industries and which has to protect itself from imports from the industrially advanced countries like the United Kingdom and the United States of America. The statement giving the comparison will be found in Appendix XVII. It will be observed that the duty in Australia on brass sheets, circles and strips is 50 per cent. against our existing duty of 30 per cent. and proposed duty of 35 per cent. ; the duty on rods is 50 per cent. as against our existing duty of 30 per cent. and the proposed duty of 35 per cent. The duty on electric wires and cables in Australia is 45 per cent. as against our existing duty of 10 per cent. and the proposed duty of 30 per cent. Conditions of course are not altogether comparable in the two countries. For instance, brass is much more a poor man's article in this country than it is in Australia, but even so, the disparities in duties indicate that the duties proposed by us are not over-protective or more discriminatory against imports.

## CHAPTER VIII—SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

**Primary or virgin metals :**

56. Our recommendations and conclusions are summarised as under :—

**(i) Copper.**

(1) India will have to depend upon imports of copper, electrolytic as well as fire-refined, of the order of 58,000 tons per year. (Paragraph 9.)

(2) Steps should be taken by the Indian Copper Corporation to convert itself from a sterling company into a rupee company and to see that Indian investors have a predominant voice in the constitution of the Board of Directors. The Corporation should be given an assurance that, if the c.i.f. prices of copper at an Indian port falls below the then cost of production of copper by the firm at Ghatsila, the Corporation, subject to the change suggested above, will be entitled to ask for reconsideration of the case for protection or assistance. Removal of duty on copper unwrought and copper scrap should be confirmed. (Paragraph 10.)

**(ii) Lead.**

(3) There is a gap of 9,000 to 12,000 tons between the estimated requirements of India in regard to lead and the home production, which will have to be bridged by imports from abroad. (Paragraph 11.)

(4) The present position according to which there is no duty on lead ingot and lead scrap is satisfactory and should be continued. (Paragraph 11.)

(5) As home production of lead should be stepped up, Government should make a formal declaration that the case of the lead industry for assistance will be considered sympathetically during the next three years, provided that (*a*) the production of lead is carried on on scientific and sound business lines and (*b*) the cost of home production proves unremunerative as compared with the cost of importation of lead, at the time of the examination of this question. (Paragraph 11.)

(6) Facilities should be given to the Metal Corporation of India, Ltd., for importing certain machinery from the U. S. A. in preference to the U.K., as the U. S. A. deliveries were much quicker. (Paragraph 11.)

**(iii) Zinc.**

(7) There being no production of zinc in India and zinc being a raw material for a number of industries, the present position according to which there is no duty on zinc should be continued. There should be no duty on zinc scrap, as well as on zinc ingots, slabs, blocks, or bars. (Paragraph 12.)

**(iv) Tin.**

(8) The pre-war average Indian requirements of tin were 2,500 tons per year; and the estimated post-war consumption is 6,000 tons. (Paragraph 13.)

(9) The duty on tin and tin scrap should be removed. (Paragraph 13.)

(10) The present position according to which India gets her quota of tin from the International Tin Control Board through the U.K. Ministry of Supply is not satisfactory, and India should have direct access to the International Tin Control Board for getting its full share of tin. Every attempt should be made to have the present Indian quota of 2,000 tons raised to a figure approaching 6,000 tons which can be easily absorbed by the Indian alloy industry. (Paragraph 13.)

(11) Considering the shortage of tin, the local de-tinning industry (started in Bombay) will be assisted if (*a*) the duty on tinplate scrap is removed and (*b*) export of tinplate scrap from India is prohibited. (Paragraph 13.)

**(v) Nickel.**

(12) India has to depend upon import of nickel to meet her estimated annual requirements of 2,000 tons, the bulk of which is used for coinage. The duty on nickel and nickel scrap should be removed. The duty on nickel alloys should remain at the present level, i.e., 30 per cent. *ad valorem* but made protective. (Paragraph 14.)

**(vi) Other Non-ferrous metals.**

(13) So long as there is no production in India of other non-ferrous metals such as cobalt, chromium, tungsten, and magnesium, the existing duty of 30 per cent. *ad valorem* on all these metals should be removed as (i) they are raw materials for other industries, (ii) they do not yield substantial revenue, and (iii) Indian producers of alloys of these metals should be placed on a competitive basis with foreign producers. (Paragraph 15.)

**econdary metals ; alloys ;
nd refining of scrap :**

**(i) Brass ingot.**

(14) The Indian requirement of the yellow metal is estimated at 96,500 tons per annum, against the Indian productive capacity of about 1,00,000 tons per annum which, with the installation of electric furnaces, is likely to increase to 1,30,000 tons in the near future. (Paragraph 17.)

(15) The refining industry is an essential stage in the development of the non-ferrous metals industry in the country and must, therefore, be assisted to survive in the transition period by the imposition of as low a protective duty as possible, it being clearly understood that the industry should be so organised in the meantime that it should be able to stand on its own legs at the end of the protection period, i.e., without any protective duty. [Paragraph 18 (4).]

(16) A protective duty of 15 per cent. should be levied to safeguard the Indian brass ingot industry. [Paragraph 18 (8).]

(17) In order to avoid importation of alloys, other than brass ingots, which may be subject to a higher customs duty, brass ingot should be defined so as, on analysis, to contain (*a*) copper 74 to 55 per cent., (*b*) zinc 26 to 42 per cent., and (*c*) components other than copper and zinc, including impurities, not to exceed 3 per cent. of which not more than one-half should be tin. [Paragraph 18 (8).]

**(ii) Yellow metal alloys.**

(18) The Indian requirements of yellow metal alloys other than brass (i.e. gun-metal, bronze, bell-metal and phosphor bronze) come to approximately 15,000 tons per year, for which there is ample productive capacity in the country. (Paragraph 19.)

(19) In place of the existing revenue duty of 30 per cent. on these metals. there should be a protective duty of 40 per cent., until the end of March 1950, (Paragraph 19.)

**(iii) White metal alloys.**

(20) The total white metal production capacity in the country is 40,000 tons, the demand being roughly 15,000 tons per annum. (Paragraph 20.)

(21) The demand for tin solder in the country is 3,000 to 4,000 tons per year. Having regard to the comparatively small requirements of tin and the fact that the incidence of solder and other white metal alloys on the cost of the job in which they are used is small, the Indian industry should be protected by an adequate duty instead of by a subsidy ; and in place of the existing duty of 30 per cent., there should be a protective duty on tin solder of 50 per cent. (Paragraph 20.)

**(iv) Other white metals.**

(22) As in the case of tin solder, the duty, which should be protective, on other white metals should be 50 per cent., on the clear assumption that the duty on tin will be completely removed. (Paragraph 21.)

**(v) Type metals.**

(23) Type metal should be treated as a separate item in the Tariff Schedule. (Paragraph 22.)

(24) Subject to action on the recommendations in our report on antimony, and provided the duty on tin is removed as recommended in this report, the existing duty of 30 per cent. on type metal may remain without risk to the indigenous type metal industry. It should be made protective, in force until end of March 1950. (Paragraph 22.)

**(vi) Mazak.**

(25) The total demand of 1,000 tons per year of mazak for die-casting will have to be met from imports. So long as it is not produced in India, and zinc is free of duty, the duty on mazak containing 96 per cent. zinc should be removed, with a view to developing the die-casting industry in India. (Paragraph 23.)

**(vii) Remaining alloys.**

(26) Other alloys, i.e., nickel silver, cupro-nickel, nickel alloys, etc., should continue to be subject to the 30 per cent. *ad valorem* protective duty. (Paragraph 24.)

**Manufactures.**

(27) The production of sheets and circles developed mostly during the war, except in the case of the Indian Copper Corporation which started rolling in 1928. In so far as tubes and pipes are concerned, there was practically no production in India before the war. The same was the case with arsenical copper rod. The demand for arsenical copper rod is approximately 500 tons a year ; and the productive capacity of the only factory (the Jaipur Metal Industries Ltd., for arsenical copper rods is over a thousand tons a year. The indigenous capacity should be fully utilised. (Paragraphs 26 and 29.)

**(i) Brass sheets.**

(28) The existing revenue duty of 30 per cent. should be converted into a 35 per cent. protective duty and remain in force until the end of March 1950. Provision should be made for the adjustment of duty so as to maintain the tariff value of imported brass sheets of 4 ft. × 4 ft. average 20 SWG at the figure assumed in the report. [Paragraph 31 (*b*).] As in the case of brass ingot, so also in the case of brass sheets, the protection is for the transitional period. [Paragraph 31 (*b*).]

**(ii) Copper sheets.**

(29) The same duty, i.e., 35 per cent. should apply to copper sheets, although there is very little copper rolling in the country, and that it should be a protective duty. [Paragraph 31 (*b*).]

**(iii) Zinc and lead sheets.**

(30) The existing duty of 30 per cent. *ad valorem* on both these items should be reduced to 20 per cent. The duty should be protective and *ad valorem*. [Paragraph 31 (*c*).]

**(iv) Arsenical copper rods and brass rods.**

(31) A protective duty of 35 per cent. on both these items will be sufficient to protect the Indian industry. Also, all demands for arsenical copper rods by Government should be placed in the first instance on the Indian producers. (Paragraph 32.)

**(v) Tubes, pipes and wires.**

(32) (*a*) The existing duty of 30 per cent. *ad valorem* on tubes and pipes and sections of brass and lead should continue, but it should be made protective in place of revenue. Duty on pipes and tubes made of copper should be 35 per cent. protective in place of the present 36 per cent. standard *ad valorem* and 24 per cent. preferential revenue. (Paragraph 33.)

(*b*) The duty on brass wires should be raised from 30 to 35 per cent., it being a protective duty (Paragraph 33.)

**Manufactures other than wires and cables.**

(33) The duty on manufactured articles, such as steam and sanitary fittings, should be raised from 30 per cent. to 35 per cent. so as to bring it into level with the duty on semi-manufactures such as sheets and strips. The duty is to become protective. (Paragraph 36.)

(34) The hollow-ware industry is well established in the country, and no special assistance is necessary for it. (Paragraph 36.)

**Manufactures electrolytic copper rods and cables and wires.**

(35) The demand for electrolytic black copper rods, is roughly 10,000 tons, depending upon the demand for wires and cables. There is rod rolling capacity in the country to the extent of 30,000 tons working three shifts. [Paragraph 40 (*a*).]

(36) Similarly, there is enough capacity to meet the Indian requirements of wires and cables, except rubber-insulated cables, paper-insulated cables and certain special types of cables. [Paragraph 40 (*b*).]

(37) The quality of electrolytic copper rods, wires, cables and conductors produced in India is satisfactory. (Paragraph 41.)

(38) A protective duty of 20 per cent. should be levied on imports of electrolytic copper rods. [Paragraph 42 (3)].

(39) Simultaneously with the imposition of duty, the present embargo on import of black copper rods should be lifted, so that the production of wires and cables may not be affected and the quality of indigenous production may be kept up to the mark. [Paragraph 42 (3).]

(40) When this duty is imposed, the concession given to the cable manufacturers to import black copper rods free of duty should be withdrawn [Paragraph 42 (3).]

(41) There should be a separate item in the Tariff Schedule for electrolytic copper rods with a protective duty of 20 per cent. ; all the other copper rods will be subject to a protective duty of 35 per cent. [Paragraph 42 (3).]

(42) Item No. 72 (*e*) of the Customs Tariff Schedule which as it stands covers (*a*) bare copper wires, (*b*) paper insulated cables, and (*c*) A.C.S.R. (Aluminium conductors steel reinforced)—all of which are subject to 10 per cent. *ad valorem* revenue duty—needs splitting up because, while there is adequate capacity in the country for bare copper wires, there is no capacity for paper insulated cables which would still have to be imported and on which therefore a lower duty would be reasonable. Item No. 73 (1) of the Tariff Schedule, which also includes bare copper wires, needs recasting when the commodity is put in under a separate item, viz., 72 (*f*) which will be only for bare hard drawn or annealed electrolytic copper wires and cables of all sizes designed as parts of a transmission system. [Paragraph 42 (4).]

(43) The duty on bare hard drawn or annealed electrolytic copper wires should be raised from the present figure of 10 per cent. to a higher figure because there is more capacity for them than there is demand in the country and because a duty of 20 per cent. will be imposed on black copper rod if the recommendation in this behalf is accepted. The duty to be imposed on wires should be the 30 per cent. protective. [Paragraph 42 (4).]

(44) The third type of wire included in item No. 72 (*e*), viz., A.C.S.R. will go with the bare hard drawn or annealed electrolytic copper wires and cables of all sizes, for which a separate item 72 (*f*) has been proposed. [Paragraph 42 (4).]

(45) The reference to bare copper wires occurring in item No. 73 (1) should be removed, so that bare copper wires will be governed by only one item, viz., 72 (*f*). [Paragraph 42 (4).]

(46) The existing *ad valorem* revenue duty of $7\frac{1}{2}$ per cent. on rubber insulated cables [*vide* item No. 73 (6) of the Tariff Schedule] may remain unchanged, as also the wording of the item. [Paragraph 42 (6).]

**General.**

(47) The non-ferrous metals industry in India is generally run on sound business lines, thereby satisfying the first of the two conditions prescribed by Government for eligibility for protection. As compared with other manufacturing countries, it also satisfies the second condition, namely, the availability of raw materials, markets, natural advantages, and national interests. (Paragraph 43.)

(48) When effect is given to the recommendations for protection and assistance, the existing restrictions on import of non-ferrous metals, ores, scrap, semi-manufactures and manufactures should no longer be necessary and should be removed. (Paragraph 47.)

(49) As India will remain deficient in respect of copper, brass, lead, tin, zinc and nickel (to mention only the more important non-ferrous metals) for a considerable time to come, every attempt should be made (1) to conserve scrap by placing an embargo on export of scrap of all non-ferrous metals and alloys, and (2) to attract scrap from abroad by removing the duty on scrap of all non-ferrous metals and alloys. (Paragraph 48.)

(50) For the expansion and development of the non-ferrous metals industry in the country, a refund of duty should be given on machinery, (which is at present 10 per cent.). The refund should be given on all plant and machinery imported since the case of the non-ferrous metals industry was referred to the Board (i.e. the 3rd November 1945). (Paragraph 49.)

(51) Considering the deficiency of India in non-ferrous metals, a more vigorous policy on the part of the Central Government in regard to prospecting and proving of mines is called for. In the Metallurgical Institute proposed to be established by the Central Government at Jamshedpur, there should be a full-fledged non-ferrous section with facilities for pilot plants where concentration of ores and extraction of metals from ores or concentrates may be tried for results of commercial value. (Paragraph 50.)

(52) Government should arrange for the training of technically qualified persons for the non-ferrous metals industry in industrially advanced countries. The industry should employ suitable technical personnel and appoint a qualified technical director. (Paragraph 51.)

(53) Government should purchase metals or suitable ores in the world market and build up a reserve in the country and assist private industrialists in purchasing at concession prices associated with bulk orders and Government's good offices, as is being done in other countries (e.g., the U. S. A. and the U. K.). (Paragraph 52.)

(54) In regard to the disposal of non-ferrous metals by the Disposals Directorate of the Department of Industries and Supplies, Government should take into confidence the representatives of the non-ferrous industry, including cottage industry, with a view primarily to making the best possible use of the scrap in the interest of the industry. For this purpose, the Officer in charge of Development of Non-ferrous Metals in the Department might be associated with the disposal of the non-ferrous scrap. (Paragraph 53.)

(55) A watch should be kept on the effect of the removal of duty on primary metals lest foreign capitalists might set up plants for the production of alloys and other non-ferrous articles in India. (Paragraph 54.)

**Acknowledgments.**

57. We wish to place on record our thanks to Mr. R. N. Kapur, Technical Adviser for non-ferrous metals, for having prepared the case with considerable care and attention; to Mr. Raghava Rao, our Cost Accounts Officer, who carried out cost accounting of a number of firms under great pressure and in difficult conditions caused by incomplete accounts; to Dr. D. P. Antia of the Department of Industries and Supplies, for the valuable help given from time to time; to V. P. Sondhi of the Geological Survey of India and Mr. G. C. Mitter of the Mint, Bombay, for having helped us at the public inquiry; to the representatives of the Non-ferrous Metals Manufacturers' Association and the industry generally for having put the case fairly and squarely before the Board so as to facilitate our deliberations and conclusion; and to Varma, our Assistant Secretary, for general supervision over the work connected with the case.

SHANMUKHAM CHETTY—President.
C. C. DESAI—Member-Secretary.
NAZIR AHMAD—Member.
H. L. DEY—Member.

RAMA VARMA—Assistant Secretary.

Srinagar, the 6th October, 1946.

# APPENDIX I.

## DEPARTMENT OF COMMERCE

## RESOLUTION

### TARIFFS

New Delhi, the 3rd November 1945.

No. 218-T (55)/45.—In the statement on industrial policy issued by the Government of India on the 23rd April 1945, it was announced that, pending the formulation of a tariff policy appropriate to the post-war needs and conditions of the country and the establishment of permanent machinery for the purpose, Government would set up machinery for investigating claims from industries, which have been started or developed in war-time and which are established on sound lines, to assistance or protection during the transition period. A press communique issued on the same date invited industries to address their claims to the Secretary to the Government of India in the Department of Commerce.

2. Several industries have accordingly applied for assistance or protection, and on a preliminary examination of their claims, the Government of India have come to the conclusion that applications submitted by the following industries call for a detailed examination :—

(i) non-ferrous metals, including antimony ;
(ii) grinding wheels ;
(iii) caustic soda and bleaching powder ;
(iv) sodium thiosulphate, sodium sulphite anhydrous, sodium bisulphite ;
(v) phosphates and phosphoric acid ;
(vi) butter colour, aerated water powder colour ;
(vii) rubber manufactures ;
(viii) fire hose ;
(ix) wood screws ;
(x) steel hoops for baling.

Other applications are under the consideration of Government and further action in their case will be taken in due course.

3. In addition to the industries which have applied for assistance or protection, there are certain industries the starting of which was considered essential by the Government of India under conditions created by the war. Early in 1940, Government announced that specified industries promoted with their direct encouragement during war-time might feel assured that, if they were conducted on sound business lines, they would, by such measures as Government might devise, be protected against unfair competition from outside India. In accordance with

this decision, the following industries have been given an assurance of protection against unfair competition after the war :—

(i) bichromates ;

(ii) steel pipes and tubes up to a nominal bore of 4 inches ;

(iii) aluminium ;

(iv) calcium chloride ;

(v) calcium carbide ;

(vi) starch.

Of these industries, only those engaged in the manufacture of bichromates, calcium chloride and starch have so far applied for assistance or protection during the transition period. The Government of India consider that the applications submitted by these three industries also call for immediate investigation.

4. For the purpose of these and any subsequent investigations, the Government of India have decided to set up a Tariff Board for a period not exceeding two years, in the first instance. The Board will consist of :—

PRESIDENT :

Sir R. K. Shanmukham Chetty, K.C.I.E.

MEMBERS :

Mr. C. C. Desai, C.I.E., I.C.S.

Prof. H. L. Dey, D.Sc. (London).

The Board will include one more Member whose name will be announced shortly. Mr. Desai will act as Secretary to the Board in addition to his duties as Member.

5. The Tariff Board is requested to undertake, in such order as it thinks fit, the investigation of claims put forward by the industries specified in paragraphs 2 and 3 above. In the case of each industry the Board will, after such examination as it considers necessary, report whether the industry satisfies the following conditions :—

(1) that it is established and conducted on sound business lines ; and

(2) (*a*) that, having regard to the natural or economic advantages enjoyed by the industry and its actual or probable costs, it is likely within a reasonable time to develop sufficiently to be able to carry on successfully without protection or State assistance ; or

(*b*) that it is an industry to which it is desirable in the national interest to grant protection or assistance and that the probable cost of such protection or assistance to the community is not excessive. Where a claim to protection or assistance is found to be established, i.e., if condition (1) and condition (2) (*a*) or (*b*) are satisfied, the Board will recommend—

(i) whether, at what rate and in respect of what articles, or class or description of articles, a protective duty should be imposed ;

(ii) what additional or alternative measures should be taken to protect or assist the industry ; and

(iii) for what period, not exceeding three years, the tariff or other measures recommended should remain in force.

In making its recommendations the Board will give due weight to the interests of the consumer in the light of the prevailing conditions and also consider how the recommendations affect industries using the articles in respect of which protection is to be granted. Since relief, to be effective, should be afforded without delay, the Board is requested to complete its enquiries with all possible expedition and to submit a report as soon as the investigation of the claim of each industry is concluded.

6. The headquarters of the Board will be at Bombay, but it will visit such other places as it thinks necessary for purposes of its enquiries. Firms and persons interested in any of these industries, or in industries dependent on the use of the products of these industries, who desire that their views should be considered, should address their representations to the Secretary to the Board.

7. Any claims hereafter received from other industries which in the opinion of the Government of India are suitable for examination by the Board will be referred to the Board in due course for examination.

8. The Government of India trust that Provincial Governments and Administrations will afford the Board all the assistance which it may require and will comply with any request for information which may be addressed to them by it.

N. R. PILLAI,

Secretary.

## APPENDIX II.

*List of producers to whom the questionnaire was issued.*

1. Annapurna Metal Works, Calcutta.
2. Ashok Manufacturing Co., Ltd., Lahore.
3. Bombay Brass Works, Jullunder City.
4. Banarsi Shah Charan Singh, Gujranwala, Punjab.
5. Binani Metal Works, Ltd., Howrah, Calcutta.
6. Bengal Ingot Co., Ltd., Kidderpore, Calcutta.
7. Bombay Metals & Alloys Mfg. Co., Ltd., (Gerhard Gabriel), Bombay.
8. Bharat Cable & Rubber Works, Ltd., Delhi.
9. Bangalore White Lead Syndicate, Bangalore.
10. Bengal Wire Nails Co., Ltd., Park Circus, Calcutta.
11. Baroda Steels Ltd., Bombay.
12. Battacharaya P. K. & Co., Calcutta.
13. Devi Dayal & Sons, Bombay.
14. Dan Decker & Co., Mahim, Bombay.
15. Eyre Smelting Co., Calcutta.
16. General Metal Industries, Mirzapur.
17. Ganga Metal Refinery & Co., Calcutta.
18. Gulamally Abdulhussein & Co., Bombay.
19. Govardhandas P. A., Jullunder City.
20. Gupta Rolling Mills, Bombay.
21. Gujranwala Metal Works, Gujranwala, Punjab.
22. Hindustan Metal Refinery & Rolling Mills, Ltd., Madras.
23. Hindustan Wire Products Co., Benares.
24. Indian Cable Co., Ltd., Tatanagar.
25. Indian Copper Corporation Ltd., Ghatsila (Singhbhum) B. N. Rly.
26. Indian Standard Metal Co., Ltd., Bombay.
27. Indian Metal Refinery, Sewree, Bombay.
28. Indian Smelting & Refining Co., Ltd., Bombay.
29. India Rolling Mills, Calcutta.
30. Indian Red Lead Factory, Ltd., Tollygunge, Calcutta.

31. Indian Lead Products, Calcutta.
32. Indian Metal & Metallurgical Corporation, Madras.
33. Jaipur Metal Industries Ltd., Jaipur.
34. Jayant Metal Mfg. Co., Ltd., Bombay.
35. Kamani Metals & Alloys Ltd., Kurla, Bombay.
36. Kamani Engineering Corporation, Lahore.
37. Lillooah Steel & Wire Products, Ltd., Calcutta.
38. Leslie W. & Co., Ltd., Punjab.
39. Lalloobhai Aminchand, Bombay.
40. Metal Corporation of India, Ltd., Tundoo, Katrasgarh, E. I. Rly.
41. Metallica Works, Bombay.
42. National Screw & Wire Products, Ltd., Belur, E. I. Rly.
43. Non-Ferrous Metals & Refinery Ltd., Mazagaon, Bombay.
44. National Rolling Mills, Ltd., Calcutta.
45. National Insulated Cable Co. of India Ltd., Calcutta.
46. National Copper Tube Mfg. Co., Ltd., Karachi.
47. National Pipes & Tubes Co., Ltd., Calcutta.
48. National Iron & Steel Co., Ltd., Calcutta.
49. Octavious Steel Co., Managing Agents, Venesta Ltd., Calcutta.
50. Omega Metal Refinery, Calcutta.

51. Pragdas Girdhardas, Calcutta.
52. Prakash Engineering Co., Duliagunj, Agra.
53. Refinery H. G., Connagar, Hooghly.
54. Saru Smelting & Refining Corporation, Meerut.
55. Steel & General Mills Co., Ltd., Moghulpura, Lahore.
56. Shaparia Dock & Steel Co., Ltd., Bombay.
57. Stone J. & Co., India Ltd., Kidderpore, Calcutta.
58. Sharma S. R. & Sons, Calcutta.
59. Tarruck R. & Co., Lillooah, Calcutta.
60. Technice, Bombay.
61. United Metal Works, Amritsar.
62. Waldie D. & Co., Calcutta.
63. Waldies Industries Ltd., Calcutta.

*Besides the views of the following Associations were also sought.*

1. All India Non-Ferrous Metalware Manufacturers' Association, Bombay.
2. Federation of British Industries, Calcutta.
3. Indian Non-Ferrous Metals Manufacturers' Association, Calcutta.
4. India Committee of Cable Makers' Association, Calcutta.
5. Southern India Metal Distributors' Association, Madras.

## APPENDIX III.

*List of consumers to whom the questionnaire was issued.*

1. Ahmed A. Fazalbhoy & Co., Calcutta.
2. All India Non-ferrous Metalware Mfg. Association, Bombay.
3. Balmer Laurie & Co., Ltd., Calcutta.
4. Brass and Copper Merchants' Association, Farukhabad, U. P.
5. Bombay Municipal Corporation, Bombay.
6. Benares Brass Merchants' Association, Benares.
7. British Metal Corporation, Calcutta.
8. Controller of Stores, G. I. P. Railway, Bombay.
9. Controller of Stores, B. B. & C. I. Railway, Bombay.
10. Controller of Stores, Bombay Telephones, Bombay.
11. Controller of Telegraph Stores, Alipore, Calcutta.
12. Chief Electrical Engineer, Government of Madras, Madras.
13. Chief Electrical Engineer, Government of Travancore, Trivandrum.
14. East India Metal Merchants' Association, Calcutta.
15. Federation of Metal Associations, Mirzapur.
16. Federation of Punjab Metal Merchants' Association, Delhi.
17. Federation of Punjab Metal Merchants' Association, Amritsar.
18. Gillanders Arbuthnot & Co., Clive Street, Calcutta.
19. Galvanized Steel Products (1941) Ltd., Calcutta.
20. General Manager, M. S. M. Railway, Madras.
21. General Manager, B. B. C. I. Railway, Bombay.
22. Greaves Cotton Crompton Parkinsons, Ltd., Calcutta.
23. Hand Made Brass and Copper Utensils Mfg. Association, Muttra.
24. Hindu-Muslim Metal Mfgs. Association, Moradabad.
25. Hyderabad Brass Products, Ltd., Hyderabad (Dn.).
26. His Majesty's Mint, Bombay.
27. Indian Copper Corporation, Ghatsila.
28. Imperial Galvanising Works, Calcutta.
29. Indian Cable Company, Ltd., Calcutta.
30. Indian Steel and Wire Products Ltd., Tatanagar.
31. Kasara Association, Hapur.

32. Martin and Company, Calcutta.
33. Metal Exchange Association Ltd., Bombay.
34. Metalware Dealers' and Manufacturers' Association, Hathres, U. P.
35. Metal Merchants' Association, Moradabad.
36. Metal Hardware Manufacturers' Association, Punjab.
37. National Insulated Cable Co. of India Ltd., Calcutta.
38. National Rolling Mills, Ltd., Calcutta.
39. National Metal Industries Ltd., Calcutta.
40. Octavious Steel & Co., Ltd., Managing Agents of Electric Supply Co., Ltd., Calcutta.
41. South Madras Electric Supply Corporation Ltd., Trichinopoly.
42. South Indian Metal Distributors' Association, Madras.
43. Superintendent, Gun Carriage Factory, Jubbulpore.
44. Superintendent, Metal & Steel Factory, Ishpore.
45. Superintendent, Bran Gun Factory, Secunderabad.
46. Superintendent, Ordnance Factory, Khamana.
47. Superintendent, Cordite Factory, Arvonkadh.
48. Superintendent, Ammunition Factory, Kirkee.
49. Tata Iron and Steel Co., Ltd., Bombay.
50. Volkart Bros., Ltd., Calcutta.
51. Waldie D. & Co., Ltd., Calcutta.

# APPENDIX IV

*List of importers to whom the questionnaire was issued.*

1. British Insulated Cables Ltd., Calcutta.
2. British Metal Corporation (India) Ltd., Calcutta.
3. Baghat Singh Bugga & Co., Calcutta.
4. Balsara & Co., Bombay.
5. Balmer Lawrie & Co., Calcutta.
6. Clubwalla & Co., Bombay.
7. Chotlal Kusaldas, Kosala Mohalla, Bombay.
8. Devi Dayal & Sons, Bombay.
9. Greaves Cotton & Co., Bombay.
10. Gillanders Arbuthnot & Co., Calcutta.
11. Gulamalli Abdulhussein & Co., Bombay.
12. Henley's Telegraph Works Co. of India Ltd., Calcutta.
13. Indian Cable Co., Ltd., Tatanagar.
14. India Committee of Cable Makers' Association, Calcutta.
15. Metal Exchange Association Ltd., Bombay.
16. Mitra S. & Co., Bombay.
17. Mathurdas Govardhandas, Calcutta.
18. National Insulated Cable Co. of India Ltd., Calcutta.
19. Parsotamdas Narsingdas, Calcutta.
20. Pragdas Girdhardas, Calcutta.
21. Pragdas Mathurdas, Calcutta.
22. Radhakissan Hazare, Calcutta.
23. Volkart Brothers, Bombay.
24. Wright R. & Partners Ltd., New Delhi.
25. Waldie D. & Sons, Calcutta.
26. William Jacks Co., Calcutta.

# APPENDIX V

*List of factories visited by or on behalf of the Board.*

| Serial No. | Name of Factory | Visited by | Date. |
|---|---|---|---|
| 1 | Indian Cable Co., Ltd., Tatanagar | Mr. Desai | 3rd August 1946. |
| 2 | Indian Copper Corporation Ltd., Ghatsila | Mr. Desai<br>Mr. Kapur<br>Mr. Rao | 3rd August 1946.<br>1st, 2nd and 3rd 1946. |
| 3 | Binani Metal Works Ltd., Calcutta | Mr. Desai<br>Dr. Dey<br>Mr. Kapur | 5th August 1946. |
| 4 | India Rolling Mills Ltd., Calcutta | Mr. Rao | 5th August 1946. |
|  |  | Mr. Kapur | 21st June 1946. |
| 5 | National Rolling Mills Ltd., Calcutta | Mr. Desai<br>Dr. Dey<br>Mr. Rao | 6th August 1946. |
|  |  | Mr. Kapur | 22nd June 1946 and 6th August 1946. |
| 6 | National Insulated Cable Co. of India Ltd., Calcutta. | Mr. Desai<br>Dr. Dey<br>Mr. Rao | 6th August 1946. |
|  |  | Mr. Kapur | 22nd June 1946 and 6th August 1946. |
| 7 | Indian Red Lead Products Ltd., Calcutta | Mr. Desai<br>Mr. Kapur | 5th August 1946. |
| 8 | Eyre Smelting Works, Calcutta | Mr. Desai<br>Mr. Kapur | 5th August 1946. |
| 9 | Bengal Ingot Co., Calcutta | Mr. Desai<br>Dr. Dey<br>Mr. Kapur | 7th August 1946. |
| 10 | Jaipur Metal Works Ltd., Jaipur | Mr. Desai<br>Dr. Nazir Ahmad<br>Dr. Dey | 24th August 1946. |
|  |  | Mr. Rao | 18th August 1946. |
|  |  | Mr. Kapur | 24th August 1946. |

| Serial No. | Name of Factory. | Visited by | Date. |
|---|---|---|---|
| 11 | Kamani Metals & Alloys Ltd., Bombay | Mr. Desai<br>Dr. Nazir Ahmed.<br>Dr. Dey | 21st August 1946. |
| | | Mr. Rao | 21st August 1946. |
| | | Mr. Kapur | 21st August 1946. |
| 12 | Metal Corporation of India Ltd., Tundoo | Mr. Kapur | 11th August 1946. |
| 13 | Bombay Metals & Alloys Mfg. Co., Ltd., Bombay. | Mr. Kapur | 23rd July 1946. |
| 14 | Devidayal & Sons, Bombay | Mr. Kapur | 24th July 1946. |
| 15 | Standard Metals & Alloys Ltd., Bombay | Sir Shanmukham Chetty.<br>Mr. Desai<br>Dr. Nazir Ahmad<br>Dr. Dey | 31st July 1946. |
| | | Mr. Kapur | 29th July 1946. |
| 16 | Metal Rolling Works, Bombay | Sir Shanmukham Chetty.<br>Dr. Nazir Ahmad-<br>Mr. Kapur | 27th July 1946. |
| 17 | Lallubhai Aminchand, Bombay | Mr. Kapur | 27th July 1946. |
| 18 | Jayant Metal Manufacturing Co., Bombay | Sir Shanmukham Chetty.<br>Mr. Desai<br>Dr. Nazir Ahmad-<br>Dr. Dey | 31st July 1946. |
| | | Mr. Kapur | 24th July 1946. |

# APPENDIX VI

*List of factories whose accounts were examined by the Cost Accounts Officer.*

| | | |
|---|---|---|
| 1. | Indian Copper Corporation Ltd., Ghatsila .. | From 1st to 3rd August 1946. |
| 2. | National Rolling Mills Ltd., Calcutta .. | From 5th to 7th August 1946. |
| 3. | National Insulated Cable Co. of India Ltd., Calcutta. | From 8th to 10th August 1946. |
| 4. | Jaipur Metal Industries Ltd., Jaipur .. | From 17th to 18th August 1946. |
| 5. | Kamani Metal & Alloys Ltd., Bombay .. | From 21st to 24th August 1946. |

## APPENDIX VII

*List of witnesses examined by the Board, the interest represented by them and the dates on which they were examined.*

| No. | Name of the witness. | Interest represented. | Date on which examined. |
|---|---|---|---|
| 1 | All-India Non-ferrous Metalware Manufacturers' Association, Bombay, represented by :—<br>Mr. V. H. Shah (of Lahore)<br>Mr. C. P. Bhatt and<br>Mr. R. M. Shah. | Association of importers and consumers. | 11th to 14th September. |
| 2 | Ashok Manufacturing Co., Lahore, represented by :—<br>Mr. Ashoknath. | Producers of manufactures (sanitary fittings). | 14th and 16th September. |
| 3 | B. B. & C. I. Railway, Bombay, represented by :—<br>Mr. Vacha. | Consumers .. | 11th and 12th September. |
| 4 | Bengal Ingot Co., Ltd., Calcutta, represented by :—<br>Mr. W. E. Bell. | Producers of secondary metals and alloys. | 11th and 12th September. |
| 5 | Binani Metal Works Ltd., Calcutta, represented by :—<br>Mr. G. D. Binani. | Do. .. | 12th and 13th September. |
| 6 | Bombay Brass Works Co., Jullunder City, represented by :—<br>Mr. S. I. Huq. | Producers of sanitary fittings. | 11th September. |
| 7 | Bombay Metals and Alloys Manufacturing Co., Ltd., Bombay, represented by :—<br>Mr. G. L. Gabriel and<br>Mr. F. S. Levy. | Producers of secondary metals and alloys. | 11th, 12th and 13th September. |
| 8 | Bombay Metal Mart, Bombay, represented by :—<br>Mr. C. M. Motani. | Importers and consumers. | 11th, 12th and 13th September. |
| 9 | Devi Dayal and Sons, Bombay, represented by :—<br>Mr. T. T. Ghandhi. | Producers of secondary metals and semi-manufacturers. | 11th, 12th and 13th September. |
| 10 | Federation of British Industries, Calcutta, represented by :—<br>Mr. Tyabjee. | Foreign (British interest). | 10th September. |
| 11 | G. I. P. Railway, Bombay, represented by :—<br>Mr. Killawala. | Consumers .. | 11th and 12th September. |
| 12 | Goverdhandas P-A., Jullunder City, represented by :—<br>Mr. B. L. Kamal. | Producers of sanitary fittings. | 11th to 14th September. |

| No. | Name of the witness. | Interest represented. | Date on which examined. |
|---|---|---|---|
| 13 | Greaves Cotton & Co., Bombay, represented by:—<br>Mr. D. M. Bharucha and<br>Mr. Kemp. | Importers .. | 11th, 12th, 13th and 14th September. |
| 14 | General Electric Co., (India) Ltd., Bombay, represented by:—<br>Mr. E. Penn. | Importers .. | 11th September. |
| 15 | Indian Cable Co., Calcutta, represented by:—<br>Mr. J. D. MacIntosh. | Consumers (Electrolytic rods). | 11th September. |
| 16 | Indian Copper Corporation, Ghatsila, represented by:—<br>Mr. R. R. Dempster and<br>Mr. Berry. | Producers of virgin metal (copper). | 10th and 11th September. |
| 17 | India Committee of Cable Makers' Association, Calcutta, represented by:—<br>Mr. F. Moore. | Association of importers of cables. | 11th September. |
| 18 | Indian Non-ferrous Metal Manufacturers' Association, Calcutta, represented by:—<br>Mr. C. C. Thakkar,<br>Mr. G. L. Gabriel,<br>Mr. G. D. Binani,<br>Mr. J. H. Mehta, and<br>Mr. C. G. Chandrasekar. | Association of producers. | 11th to 14th and 16th September |
| 19 | Indian Smelting and Refining Co., Ltd., Bombay, represented by:—<br>Mr. B. Reiser, and<br>Mr. B. K. Nevatia. | Producers of secondary metals. | 12th, 13th and 14th September. |
| 20 | Indian Standard Metal Co., Ltd., Bombay, represented by:—<br>Mr. F. R. Goldschmidt. | Do. .. | 11th, 12th, 13th and 14th September. |
| 21 | Jaipur Metal Industries Ltd., Jaipur, represented by:—<br>Mr. R. H. Kamani. | Producers of secondary metals and semi-manufactures. | 11th, 12th and 13th September. |
| 22 | Jayant Metal Manufacturing Co., Bombay, represented by:—<br>Mr. Chimanlal Parek. | Producers of manufactures. | 12th and 13th September. |
| 23 | Kamani Metal and Alloys Ltd., Bombay, represented by:—<br>Dr. Jivraj Mehta,<br>Dr. C. A. Mehta, and<br>Mr. P. R. Kamani. | Producers of secondary metals and semi-manufactures. | 11th to 14th September. |
| 24 | Mond Nickel Company, London, represented by:—<br>Mr. McNeil. | Importers .. | 11th, 12th and 13th September. |

| No. | Name of the witness. | Interest represented. | Date on which examined. |
|---|---|---|---|
| 25 | Metal Exchange Association, Bombay, represented by :—<br>Mr. Chimanlal. | Importers and consumers. | 12th and 13th September. |
| 26 | Metal Corporation of India, Ltd., Calcutta, represented by :—<br>Mr. A. T. Ganguli, and<br>Mr. A. C. Dutta. | Producers of virgin metal (lead). | 16th September. |
| 27 | National Insulated Cable Co. of India Ltd., Calcutta, represented by :—<br>Mr. T. S. Sitapati. | Producers of wires and cables and consumer of rods. | 11th and 12th September. |
| 28 | National Rolling Mills Ltd., Calcutta, represented by :—<br>Mr. T. S. Sitapati. | Producers of electrolytic wire rods. | 11th and 12th September. |
| 29 | Southern India Metal Distributors' Association, Madras, represented by :—<br>Mr. J. P. Sanghrajka. | Association of importers and consumers. | 11th to 14th September. |
| 30 | Prakash Engineering Works, represented by :—<br>Mr. B. N. Gupta. | Producers of secondary metals and alloys and semi-manufacturers. | 13th September. |
| 31 | Tata Iron and Steel Co., Ltd., represented by :—<br>Mr. S. K. Nanavathy, and Mr. Das. | Consumers .. | 11th to 13th September. |

## APPENDIX VIII

*Statement showing the estimated cost of production of copper by the Indian Copper Corporation Ltd.*

Estimated quantity of output : 7000 long tons per annum.

| *Items.* | *Amount per ton.*<br>Rs. |
|---|---|
| *Manufacturing Expenses—* | |
| 1. Raw Materials .. .. .. .. | ..... |
| 2. Power and fuel .. .. .. .. | 100·60 |
| 3. Ordinary current repairs and maintenance of buildings, plant and machinery. | 117·33 |
| 4. Labour .. .. .. .. | 281·44 |
| 5. General services, supervision and local office charges.. | 107·92 |
| 6. Expenditure on quality control, research and development. | 8·71 |
| 7. Packing charges .. .. .. .. | ..... |
| 8. Miscellaneous, water, lighting, royalties, consumable stores etc. | 279·18 |
| Total .. | 895·18 |
| II. *Overhead Charges—* | |
| 9. Depreciation at statutory rates .. .. | 52·73 |
| 10. Interest on working capital .. .. | 19·43 |
| 11. Managing Agents' charges .. .. .. | .... |
| 12. Directors' and Auditors' fees .. .. .. | 21·17 |
| 13. Insurance .. .. .. .. | 11·02 |
| 14. Rents, rates and taxes excluding income-tax and royalties. | 1·90 |
| 15. Selling expenses .. .. .. .. | .... |
| 16. Miscellaneous .. .. .. .. | 6·28 |
| Total .. | 112·53 |
| Gross total I and II .. | 1007·71 |
| Credit for materials recovered .. | Nil. |
| Net total .. | 1007·71 |
| Profit at 10 per cent. on fixed capital .. .. | 61·43 |
| Fair selling price .. .. .. .. | 1069·14 |
| | Rs. a. p. |
| Or | 1,069 2 0 |

# APPENDIX IX

Graph indicating the trend of world prices and world production during 1930 to 1946 of :—

(i) Copper ;

(ii) Lead ;

(iii) Zinc ;

and (iv) Tin.

# APPENDIX X.

(i) STATISTICS OF EXPORT :—*Statement showing the total quantity and value of exports (private and Government stores) of non-ferrous metals (mainly scrap) from India, since 1937-38.*

| Year. | Copper. | | Lead. | | Tin. | | Zinc or spelter. | | Brass, bronze and other similar alloys and manufactures thereof (wrought). | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity | Value. |
| | Tons. | Rs. | Tons. | Rs. | Tons. | Rs. | Tons. | Rs. | Tons. | Rs. |
| 1937-38 .. .. | 267·90 | 3,02,451 | 306·40 | 1,28,756 | 3573·95 | 4,09,556 | 517·20 | 26,852 | 747·10 | 10,87,370 |
| 1938-39 .. .. | 148·45 | 1,63,160 | 341·30 | 1,49,894 | 3316·65 | 2,66,545 | 326·75 | 40,902 | 578·15 | 8,21,094 |
| 1939-40 .. .. | 136·20 | 1,77,480 | 991·15 | 5,27,481 | 1485·70 | 1,50,333 | 283·50 | 12,974 | 556·00 | 8,32,933 |
| 1940-41 .. .. | 113·45 | 1,95,405 | 687·80 | 5,01,987 | 1266·15 | 5,00,991 | 193·50 | 10,563 | 735·90 | 12,32,691 |
| 1941-42 .. .. | 55·70 | 1,30,913 | 2967·05 | 20,75,705 | 142·25 | 2,30,734 | 1·25 | 1,812 | 223·20 | 5,43,888 |
| 1942-43 .. .. | 18·80 | 2,29,226 | 748·50 | 5,54,584 | 1·40 | 2,948 | 6·45 | 23,311 | 90·10 | 5,36,284 |
| 1943-44 .. .. | 10·85 | 43,250 | 7·70 | 11,561 | 0·80 | 3,623 | 0·15 | 589 | 87·15 | 9,08,589 |
| 1944-45 .. .. | 3·85 | 2,476 | 86·90 | 2,02,400 | 105·50 | 4,15,380 | 0·05 | 206 | 299·35 | 43,10,662 |
| 1945-46 (for nine months only, April to December, 1945). | 5·10 | 13,916 | 14·70 | 35,888 | 0·10 | 202 | 0·15 | 356 | 188·35 | 17,58,368 |

(ii) STATISTICS OF IMPORTS :—*Statement showing the total quantity and value of imports (private and Government stores) of non-ferrous metals into India since 1936-37.*

| Years. | Copper (excluding ore). |  | Lead. |  | Tin. |  | Zinc or Spelter. |  | Brass, Bronze, and similar alloys. |  | German silver (including nickel silver). |  | Unenumerated metals. |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. |
|  | Tons. (000) | Rs. (000) | Tons. (000) | Rs. (000) | Tons. (000) | Rs. (000) | Tons. (000) | Rs. (000) | Tons. (000) | Rs. (000) | Tons. (000) | Rs. (000) | Tons. (000) | Rs. (000) |
| 1936-37* .. | 12 | 86,75 | 1 | 5,16 | 2 | 65,41 | 23 | 49,86 | 16 | 97,69 | 1 | 14,19 | 1 | 5,20 |
| 1937-38 .. | 19 | 1,50,96 | 9 | 31,89 | 3 | 95,49 | 22 | 76,86 | 11 | 87,38 | 1 | 14,47 | 1 | 11,61 |
| 1938-39 .. | 11 | 83,01 | 8 | 21,46 | 3 | 73,06 | 26 | 56,40 | 16 | 1,06,26 | 2 | 16,42 | 2 | 19,08 |
| 1939-40 .. | 16 | 1,33,22 | 14 | 45,76 | 4 | 1,30,03 | 23 | 59,82 | 10 | 73,25 | 1 | 10,70 | 1 | 7,85 |
| 1940-41 .. | 17 | 1,63,22 | 16 | 60,73 | 4 | 1,03,54 | 23 | 97,07 | 4 | 48,10 | 1 | 5,63 | 1 | 15,32 |
| 1941-42 .. | 18 | 1,90,59 | 18 | 71,86 | 4 | 1,60,94 | 16 | 1,00,72 | 4 | 56,35 | 1 | 3,90 | 2 | 22,77 |
| 1942-43 .. | 18 | 1,73,68 | 2 | 16,98 | .. | 2,32 | 12 | 74,99 | 2 | 28,99 | .. | 4 | 1 | 15,04 |
| 1943-44 .. | 16 | 1,59,85 | 1 | 4,49 | .. | 44 | 2 | 8,84 | 1 | 15,56 | .. | .. | .. | 5,33 |
| 1944-45 .. | 19 | 1,92,74 | 1 | 4,54 | .. | 35 | 3 | 20,13 | 1 | 21,80 | .. | .. | .. | 10,10 |
| 1945-46† .. | 10 | 1,02,64 | 22 | 98,68 | .. | 2,62 | 5 | 26,77 | 6 | 84,64 | .. | .. | 1 | 11,84 |

*Excluding imports into Burma.

†For nine months only, from April to December 1945.

All figures rounded off to the nearest thousand.

Source : Annual statements of sea-borne trade of India and the monthly accounts.

## APPENDIX XI

*Estimated Indian requirements of Yellow Metal.*

| | Tons. |
|---|---|
| (*a*) Railways' requirements .. .. .. | 15,000 |
| (*b*) Gunmetal Castings .. .. .. .. | 15,000 |
| (*c*) Brass ingots likely to be used for castware utensils and other articles made by cottage workers. | 10,000 |
| (*d*) Melting capacity required for manufacturing 40,000 tons of brass and copper sheets, being the estimated requirements. | 45,000 |
| (*e*) Melting capacity required for brass and copper rods (estimated at 3,000 tons). | 4,000 |
| (*f*) Melting capacity required for brass and copper wires (estimated at 2,000 tons). | 2,500 |
| (*g*) Miscellaneous requirements .. .. .. | 5,000 |
| | 96,500 |

## APPENDIX XII

*Annual productive capacity of yellow metals in India.*

| | Name of Plant. | Location. | Peak production Capacity. |
|---|---|---|---|
| | | | Tons. |
| 1. | Indian Copper Corpotation Ltd. | Ghatsila | 20,000 |
| 2. | Jaipur Metal Industries Ltd. | Jaipur | 7,500 |
| 3. | Kamani Metals & Alloys Ltd. | Bombay | 7,500 |
| 4. | Binani Metal Works Ltd. | Calcutta | 6,000 |
| 5. | Bombay Metal & Alloy Mfg. Co., Ltd. | Bombay | 5,500 |
| 6. | National Screw & Wire Products Ltd. | Belur (Howrah) | 4,800 |
| 7. | India Smelting & Refining Co., Ltd. | Bombay | 4,000 |
| 8. | India Metal Refinery | Do. | 3,800 |
| 9. | Prakash Engineering Co. | Agra | 3,500 |
| 10. | Bengal Ingot Co., Ltd. | Calcutta | 3,250 |
| 11. | Indian Standard Metal Works Ltd. | Bombay | 3,000 |
| 12. | Saru Smelting & Refining Corp. | Meerut | 3,000 |
| 13. | Hindustan Metal Refinery & Rolling Mills | Madras | 3,000 |
| 14. | Devi Dayal & Sons | Bombay | 2,400 |
| 15. | Gupta Rolling Mills & Refineries | Bombay | 1,800 |
| 16. | Baroda Steels Ltd. | Baroda | 1,800 |
| 17. | Bombay Metal Rolling Works | Bombay | 1,800 |
| 18. | Omega Metal Refinery Ltd. | Calcutta | 1,200 |
| 19. | India Rolling Mills Ltd. | Do. | 1,000 |
| 20. | Lilloah Steel & Wire Co., Ltd. | Howrah | 700 |
| 21. | General Metal Industries | Mirzapur | 700 |
| 22. | Metallica Works | Bombay | 500 |
| 23. | Indian Metal & Matallurgical Corporation | Madras | 500 |
| 24. | Others | .... | 12,400 |
| | | | 1,00,000 |

# APPENDIX XIII

## *The Common Non-Ferrous Industrial Alloys.*

The Non-Ferrous industrial alloys now number several thousand. The following table includes a few of those most commonly used. The composition, even of the alloys listed, varies between fairly wide limits with a corresponding variation in physical properties and applications.

The information given under " Uses " is intended merely to indicate the general nature of the alloy.

| Name. | Composition | Per cent. | Uses. |
|---|---|---|---|
| Admiralty metal .. | Copper .. | 70 | Condenser tubes for use with salt water. Marine fittings. |
| | Zinc .. | 29 | |
| | Tin .. | 1 | |
| Aluminium alloy No. 12 S.A.E. No. 30. | Aluminium .. | 92 | This alloy with slight variations in composition is the standard aluminium casting alloy used in the United States. |
| | Copper .. | 8 | |
| Aluminium brass .. | Copper .. | 70—68 | Propeller blades, rudder frames, sea valves. |
| | Zinc .. | 27—31 | |
| | Aluminium .. | 1—3 | |
| Aluminium bronze .. | Copper .. | 90 | Hard, non-corrodible. Used in parts exposed to tanning sulphite and similar corrosive liquors. |
| | Aluminium .. | 10 | |
| Bearing bronze .. | Copper .. | 70—90 | Bearing of various sorts. |
| | Tin .. | 1—10 | |
| | Lead .. | 0—15 | |
| | Zinc .. | 0—27 | |
| Gear bronze .. | Copper .. | 89 | Used for heavy gears usually against steel. |
| | Tin .. | 11 | |
| Gun bronze .. | Copper .. | 88 | Strong valves and fittings. |
| | Tin .. | 10—8 | |
| | Zinc .. | 2 | |
| | Lead .. | 2 | |

| Name. | Composition, | Per cent. | Uses. |
|---|---|---|---|
| Phosphor bronze | Copper | 80—77 | Bearing metal, wire, rod and steam fittings. |
| | Tin | 8—10 | |
| | Lead | 0—15 | |
| | Phosphorous. | ·1—0 | |
| Plastic bronze | Copper | 70—50 | Bearing metal. |
| | Lead | 30—50 | |
| | Nickel | trace. | |
| Silicon bronze | Copper | 96· | Telegraph wires, electric work. |
| | Tin | 4 | |
| | Silicon | traces. | |
| Babbitt metal | Tin | 70—90 | Bearings and anti-friction lining for bronze or steel bushing. |
| | Antimony | 7—24 | |
| | Copper | 2—22 | |
| Bell metal bronze | Copper | 80—75 | Bells, gongs etc. |
| | Tin | 20—25 | |
| | (sometimes silver, nickel or other metals). | | |
| *Brass* — | | | |
| Gilding metal | Copper | 99—80 | Cheap jewelry, gold paint. |
| | Zinc | 1—20 | |
| Dutch metal | Copper | 80—76 | Thin sheets as substitutes for gold leaf. |
| | Zinc | 20—24 | |
| Standard brass | Copper | 73—66 | Brass for cold working. Sheets, tubes, cartridges. |
| | Zinc | 27—34 | |
| White brass | Copper less than | 45 | Ornamental castings not requiring strength. |
| Brazing metal | Copper | 85 | |
| | Zinc | 15 | |
| Britannia metal | Tin | 95—90 | Cheap table ware. |
| | Antimony | 5—10 | |
| | Copper | 1—3 | |
| Chromel (Nichrome) | Nickel | 70—85 | Resistance wire for heating units crucibles, triangles, tongs (Patented). |
| | Chromium (approximate). | 15—30 | |

| Name. | Composition, | Per cent. | Uses. |
|---|---|---|---|
| Copper-beryllium .. | Copper .. | 97—98 | Heat treated to give 200,000 lb. per square inch tensile strength. Used for pump parts, springs, and non-sparking tools. |
| | Beryllium .. | 2—3 | |
| Cupro-nickel brass .. | Copper .. | 98—52 | Projectile driving bands, rifle bullet caps, electrical resistance, condenser tubes. |
| | Nickel .. | 2—48 | |
| Constantan brass .. | Copper .. | 60 | Used with copper or iron to make thermo-couples. |
| | Nickel .. | 40 | |
| Delta metal .. | Copper .. | 60 | |
| | Zinc .. | 40 | |
| | Manganese .. | 0·5—0·2 | |
| Dow metal .. | Magnesium .. | 85—92 | Standard magnesium alloys. Used as castings or forgings. |
| | Aluminium .. | 8—15 | |
| Duralumin brass .. | Aluminium | 95—5 | Strongest and best of aluminium alloys. Used in airplane and automobile parts. |
| | Copper | (Approx. 3—0 | |
| | Manganese | Composition). 1—0 | |
| | Magnesium | 0—5 | |
| Fusible metals Lipowitz .. | Bismeth .. | 50 | These and other ternary and quaternary alloys are used for fuse plugs for automatic sprinklers. |
| | Lead .. | 27 | |
| | Tin .. | 13 | |
| | Cadmium .. | 10 | |
| Woods brass .. | Bismuth .. | 38 | |
| | Lead .. | 31 | |
| | Tin .. | 15 | |
| | Cadmium .. | 16 | |
| Gun metal .. | Copper .. | 92 | Gears, heavy hydraulic castings. |
| | Tin .. | 8—12 | |
| Invar brass .. | Iron .. | 64 | Used coefficient of expansion. Used in clocks, precison instruments. |
| | Nickel .. | 36 | |
| Magnalium brass .. | Aluminium .. | 90—94 | Scientific instruments, Balance beams. |
| | Magnesium .. | 10—6 | |

| Name. | Composition, | Per cent. | Uses. |
|---|---|---|---|
| Magnolia metal (Lead-base babbitt). | Lead | 78 | Antifriction, bearing alloy. |
| | Antimony | 16 | |
| | Tin | 6 | |
| Manganin brass | Copper | 82 | High electrical resistance and low temperature co-efficient. |
| | Manganese | 15 | |
| | Nickel | 2·3 | |
| | Iron | 0·6 | |
| Manganese bronze | Copper | 56 | Propeller blades, Non-corrodible and great wearing qualities. |
| | Zinc | 41 | |
| | Tin | 0·5 | |
| | Iron | 1 | |
| | Manganese | 0·5 | |
| | Aluminium | 1 | |
| Monel metal | Nickel | 68 | Almost non-corrodible. Used for propeller blades, wire, sheets, valves, pumps etc. |
| | Copper | 27 | |
| | Iron, Manganese, Silicon | 5 | |
| Muntz metal | Copper | 60 | Sheathing for ships, bolts, nuts, condenser tubes. |
| | Zinc | 40 | |
| Naval brass | Copper | 60 | Properties like Muntz metal. Less easily corroded by sea water. |
| | Zinc | 39 | |
| | Tin | 1 | |
| Nicklin brass | Copper | 74·5 | Resistance wire. |
| | Nickel | 25 | |
| | Iron | 0·5 | |
| Nickel silver (German silver). | Nickel | 18—25 | Table wire, cheap jewellery, base for silver plating. |
| | Zinc | 20—30 | |
| | Copper | (Remainder). | |
| Pewter brass | Tin | 85—90 | Platters, bowls, cups, etc. |
| | Antimony | 15—20 | |

| Name. | Composition, | Per cent. | Uses. |
|---|---|---|---|
| Platinite brass .. | Iron .. | 54 | Same coefficient of expansion as glass. Used as substitute for platinum in equipping incandescent lamps. |
| | Nickel .. | 46 | |
| | Cobalt .. | 0·15 | |
| Platinoid brass .. | Copper .. | 60 | High resistance wire but not suitable for heating coils. |
| | Zinc .. | 24 | |
| | Nickel .. | 14 | |
| | Tungsten .. | 1—2 | |
| **Shot metal** .. | Lead .. | 99 | Casting bullets and small shots. |
| | Arsenic .. | 1 | |
| ***Solder :—*** | | | |
| **Soft** .. | Lead .. | 67 | Plumber's solder. |
| | Tin .. | 33 | |
| Hard solder .. | Lead .. | 33 | |
| | Tin .. | 67 | |
| Speculum metal .. | Copper .. | 70—65 | Takes a high polish. Used formerly in reflectors for telescopes. |
| | Tin .. | 30—35 | |
| Sterro metal (Aich's metal, Delta metal). | Copper .. | 60 | Strong as mild steel and not easily corroded. Used in hydraulic cylinders sea water valves. |
| | Zinc .. | 38 | |
| | Iron .. | 2 | |
| Type metal .. | Lead .. | 60—85 | |
| | Antimony .. | 8—20 | |
| | Tin .. | 5—35 | |
| **" Y " metal** .. | Aluminium .. | 92·5 | Used for general casting Retains strength at higher temperature than No. 12. |
| | Copper .. | 2 | |
| | Nickel .. | 2 | |
| | Magnesium .. | 1·5 | |
| Chromuim metal .. | Chromium less than. | 3 | Projectiles, files. |
| Chromium-tungsten steels. | Cobalt .. | 0·65—0·75 | High speed tools. May be run at 500° — 600° C without losing their edge. |
| | Tungsten .. | 13·5—18·5 | |
| | Chromium .. | 3·5—4·5 | |
| | Cobalt .. | 0·75—2·0 | |

| Name. | Composition. | Per cent. | Uses. |
|---|---|---|---|
| Chromium-Vanadium Steel. | Cobalt<br>Vanadium | 0·25—1<br>0·15 | Gears, springs, general automobile parts. |
| Manganese steel | Manganese | 12—14 | Used on sharp railroad curves, frogs, switches, etc., where wear is hard. |
| Nickel steel | Nickel | 3—4 | Drive shafts, cranks shafts, gears, and other automobile parts. |
| Nickel chromium steel | Nickel<br>Chromium | 1—4<br>0·45-2 | Armour plate, automobile parts subject to heavy stress. |
| Stainless steel | Chromium | 13—20 | Used in cutlery, containers for corrosive liquids etc. |
| Silicon steel | Silicon less than | 5 | Has high permeability and low hysteresis. Used in dynamo construction. |
| Stellite steel | Cobalt<br>Chromium | 80—50<br>20—50 | Non-corrodible. Used in cutlery surgical instruments. |

## APPENDIX XIV

*Statement showing the productive capacity of white metal alloys in the country.*

| | Name of the manufacturers. | Annual capacity tons. |
|---|---|---|
| 1. | Eyre Smelting & Refining Co., Kidderpore, Calcutta | 25,000 |
| 2. | Bombay Metals & Alloys Mfg. Co., Ltd., Bombay | 2,500 |
| 3. | Indian Smelting & Refining Co., Ltd., Bombay | 2,500 |
| 4. | Indian Standard Metal Works Ltd., Bombay | 2,500 |
| 5. | Jaipur Metal Industries Ltd., Jaipur | 2,500 |
| 6. | Prakash Engineering Works, Agra | 500 |
| 7. | Binani Metal Works, Calcutta | 2,500 |
| 8. | Others | 2,000 |
| | Total | 40,000 |

## APPENDIX XV

*Statement showing the estimated cost per ton of Black Copper Rods.*

Estimated quantity of output per year : 10,000 tons.

| Items. | Quantity in tons. | Rate per ton. | Amount per ton. |
|---|---|---|---|
| *I. Manufacturing Expenses :—* | | Rs. | Rs. |
| 1. Raw materials :— | | | |
| (*a*) Electrolytic copper wire bars | 1·04 | 1332·0 | 1385·28 |
| (*b*) Less scrap (at 90% of metal cost) | 0·02 | 1198·8 | 23·98 |
| | 0·02 | | 1361·30 |
| (*c*) Loss | 0·02 | .. | .. |
| | 1·00 | | 1361·30 |
| 2. Power and fuel | .. | .. | 13·44 |
| 3. Ordinary current repairs and maintenance of buildings, plant and machinery. | .. | .. | 3·35 |
| 4. Labour | .. | .. | 3·11 |
| 5. General services, supervision and local office charges. | .. | .. | 13·24 |
| 6. Expenditure on quality control, research and development. | .. | .. | .. |
| 7. Packing charges | .. | .. | 0·59 |
| 8. Miscellaneous, water, lighting, royalties consumable stores etc. | .. | .. | 4·90 |
| | | Total .. | 1404·93 |
| *II. Overhead Charges :—* | | | |
| 9. Depreciation at statutory rates | .. | .. | 16·72 |
| 10. Interest on working capital | .. | .. | 19·04 |
| 11. Managing Agents' charges | .. | .. | 1·53 |
| 12. Directors' and Auditors' charges | .. | .. | 0·23 |
| 13. Insurance | .. | .. | 0·22 |
| 14. Rents, rates, and taxes excluding income-tax and royalties. | .. | .. | 3·11 |

| Items. | Quantity in tons. | Rate per ton. | Amount per ton. |
|---|---|---|---|
| *II. Overhead Charges*—contd. | | Rs. | Rs. |
| 15. Selling expenses .. .. | .. | .. | 1·19 |
| 16. Miscellaneous .. .. | .. | .. | .. |
| | | Total .. | 42·04 |
| | Gross Total (I) and II) .. | | 1446·97 |
| Credit for materials recovered, if any (*vide* item 1 (*b*) above). .. .. | .. | .. | ... |
| | | Net Total .. | 1446·97 |
| **Profit at 10% on fixed capital** .. .. | .. | .. | 22·00 |
| Fair selling price .. .. | .. | .. | 1468·97<br>or Rs. 1,469 |

# APPENDIX XVI

*Summary of recommendations regarding variation in duty in schedule form.*

| Existing Schedule. | | | | | | | Proposed Schedule. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Item No. | Name of article. | Nature of duty. | Standard rate duty. | Preferential rate of duty if the article is the produce or manufacture of | | | Item No. | Name of article. | Nature of duty. | Proposed duty. | Reference in Report to paragraph. |
| | | | | The United Kingdom. | A British colony. | Burma. | | | | | |
| 64 | Copper, wrought and manufacture of copper all sorts not otherwise specified. | Preferential revenue. | 36 per cent. *ad valorem.* | 24 per cent. *ad valorem.* | .. | Free. | 64 | Copper wrought and manufactures of copper (excluding electrolytic copper rods) but including all sorts not otherwise specified such as sheets, strips, circles, rods, sections, (including arsenical copper rods). | Protection. | 35 per cent. | 31 (*b*), 32 and 33. |
| | | | | | | | 64 (*a*) | Electrolytic copper rods or black copper rods (in coils). | Protective. | 20 per cent. | 42 (4). |
| 64 (*1*) | Copper, scrap .. | Revenue. | 30 per cent. *ad valorem* (duty abolished since 9th March 1946). | .. | .. | Free. | 64 (1) | Copper scrap .. | .. | Free. | 43. |
| | | | | | | | 64 (2) | Copper unwrought, ingots, blooms, slabs, cakes, tiles, blocks, bricks, billets, cathodes, blister, bars (electrolytic wire bars) etc. | .. | Free | 10. |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | German silver including nickel silver. | Revenue. | 30 per cent. *ad valorem.* | .. | .. | Free. | 65 | Nickel, pellets, cakes, slabs, annodes, shorts, blocks, granules and scraps. | .. | Free .. | 14. |
| | | | | | | | 65 (*a*) | All non-ferrous nickel alloys including German silver, nickel silver and cupro nickel unwrought ard wrought. | Protective. | 30 per cent. | 14. |
| 67 | Lead wrought the following articles viz., pipes ard tubes and sheets other than sheets for tea chests. | Revenue. | 30 per cent. *ad valorem.* | .. | .. | Free. | 67 | Lead ingots, slabs, cakes blooms, piglead, blocks, bars and scrap. | .. | Free .. | 11. |
| | | | | | | | 67 (*a*) | Lead sheets other than sheets for tea chests. | Protective. | 20 per cent. | 31 (*c*). |
| | | | | | | | 67 (*b*) | Lead wrought—the following articles, viz., pipes, tubes and wires. | Protective. | 30 per cent. | 33. |
| 67 (*1*) | Lead sheets for tea chests.. | Revenue. | 30 per cent. *ad valorem.* | .. | .. | Free. | 67 (*1*) | Lead sheets for tea chests .. | Protective. | 30 per cent. | .. |
| 68 | Zinc or spelter, wrought or manufactured not otherwise specified. | Revenue. | 30 per cent. *ad valorem.* | .. | .. | Free. | 68 | Zinc or spelter, wrought or manufactured not otherwise specified. | Protective. | 30 per cent. | .. |
| | | | | | | | 68 (*a*) | Zinc sheets .. | Protective. | 20 per cent. | 31(*c*). |
| 68 (*1*) | Zinc, unwrought including cakes, ingots, tiles (other than boiler tiles, hard or soft slabs and ashes and broken zinc. | .. | Free | .. | .. | .. | 68 (*1*) | Zinc, unwrought including cakes, bars, blocks, ingots, tiles (other than boiler tiles) hard or soft, slabs and plates, dust, dross and ashes, and broken zinc. | .. | Free .. | 12. |
| 69 | Tin, block .. | Revenue. | Rs. 375 per ton. | .. | .. | Free. | 69 | Tin, unwrought in blocks, ingots, bars and slabs, including tin scrap, second grade in unrefined tin, but not including tin alloy scraps. | .. | Free .. | 13. |

| Existing Schedule. | | | | | | | Proposed Schedule. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Item No. | Name of article. | Nature of duty. | Standard rate duty. | Preferential rate of duty if the article is the produce or manufacture of | | | Item No. | Name of article. | Nature of duty. | Proposed duty. | Reference in Report to paragraph. |
| | | | | The United Kingdom. | A British colony. | Burma. | | | | | |
| 70 | Brass, bronze and similar alloys, wrought and manufactures thereof not otherwise specified. | Revenue. | 30 per cent *ad valorem.* | ... | .. | Free . | 70 | Brass, unwrought, ingots, billets, cakes, slabs, blooms excluding scrap.<br>*Note.*—Brass ingot on analysis may be found to contain (1) Copper 74 to 55 per cent. (2) Zinc 26 to 42 per cent, and (3) Components other than copper and zinc including impurities not to exceed 3 per cent of which not more than one-half should be tin. | Protective. | 15 per cent. | 18 (*8*). |
| | | | | | | | 70 (*a*) | Brass manufactures not otherwise specified such as sheets, circles, strips, rods of wires (excluding tubes and pipes) but including castings such as sanitary and other fittings. | Protective. | 35 per cent. | 31(*b*) and 33. |
| | | | | | | | 70 (*b*) | Bronze and similar alloys, such as gunmetal and phosphor bronze and manufactures thereof not otherwise specified | Protective. | 40 per cent. | 19. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 70 (*c*) White metal, tin solders and anti-friction alloys. | Protective. | 50% | .. | 20 and 21. |
| | | | | | | 70 (*d*) Type metals .. | Protective. | 30% | .. | 22. |
| | | | | | | 70 (*e*) Mazak or alloys of zinc and aluminium containing not less than 94% zinc. | .. | Free | .. | 23. |
| | | | | | | 70 (*f*) All non-ferrous metal scrap including alloy scrap, not otherwise specified. | .. | Free | .. | 46. |
| 70 (1) All sorts of metals other than iron and steel, and manufactures thereof not otherwise specified. | Revenue. | 30 per cent *ad valorem.* | ... | .. | Free. | 70 (*1*) All non-ferrous virgin metals not otherwise specified. | .. | Free | .. | 46. |
| | | | | | | 70 (2) All non-ferrous alloys and manufactures of metals and alloys not otherwise specified. | Protective. | 30% | .. | 24. |
| 72 (*e*) Machinery, namely such of the following articles as are not otherwise specified, bare hard drawn electrolytic copper wires and cables, and other electrolytic wires and cables insulated or not, and poles, troughs, conduits and insulators designed as parts of a transmission system and the fittings thereof. | Revenue. | 10 per cent *ad valorem.* | ... | .. | Free. | 72 (*e*) Machinery, namely, such of the following articles as are not specified : Paper or cambric insulated cables, and poles troughs, conduits and insulators designed as parts of a transmission and distribution system and the fittings thereof. | Protective. | 10% | .. | 42 (5). |
| | | | | | | 72 (*f*) Bare hard-drawn or annealed electrolytic wires and cables of all sizes solid or stranded and A. C. S. R. (alluminium conductor steel reinforced). | Protective. | 30% | .. | 42(5). |
| 73(1) The following electrical instruments, apparatus and appliances, namely :— Electrical control gear and transmission gear. | Preferential Revenue. | 36% *ad valorem.* | 24% *ad valorem.* | .. | 12% *ad valorem.* | 73 (*1*) The following Electrical instruments.<br>Apparatus and appliances, namely : Electrical Control Gear, transmission namely, switches (excluding switch | Protective. | 36 per cent *ad valorem* 24 per cent United Kingdom. 12 per cent Burma. | | 42 (5). |

| Existing Schedule. | | | | | | | Proposed Schedule. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Item No. | Name of article. | Nature of duty. | Standard rate of duty. | Preferential rate of duty if the article is the produce or manufacture of | | | Item No. | Name of article. | Nature of duty. | Proposed duty. | Reference in Report to paragraph. |
| | | | | The United Kingdom. | A British colony. | Burma. | | | | | |
| | Namely, switches (excluding switch boards), fuses and current-breaking devices of all sorts and descriptions, designed for use in circuits of less than ten amperes and at a presure not exceeding 250 volts; and regulators for use with motors designed to consume less than 187 watts; bare or insulated copper wires and cables, any one core of which, not being one specially designed as a pilot core, has a sectional area of less than one-eightieth part of a square inch, and wires and cables of other metals of not more than equivalent conductivity; and line insulators, including also cleats, connectors, leading in tubes and the like, of types and sizes such as are ordinarily | | | | | | | boards), fuses and current-breaking devices of all sorts and descriptions, designed for use in circuits of less than ten amperes and at a pressure not exceeding 250 volts; and regulators for use with motors designed to consume less than 187 watts; insulated copper wires and cables, any one core of which, not being one specially designed as a pilot core, has a sectional area of less than one-eightieth part of a square inch, and wires and cables of other metals of not more than equivalent conductivity; and line insulators, including also cleats, connectors, leading in tubes and the like, of types and sizes such as are ordinarily used in connection with the | | | |

| | |
|---|---|
| used in connection with the transmission of power for other than industrial purposes, and the fittings thereof but excluding electrical earthenware and porcelain otherwise specified. | transmission of power for other than industrial purposes, and the fittings thereof but excluding electrical earthenware and porcelain otherwise specified. |

# APPENDIX XVII

*Comparative Study of the duties for Non-Ferrous Metals in Australia and the proposed duties in India.*

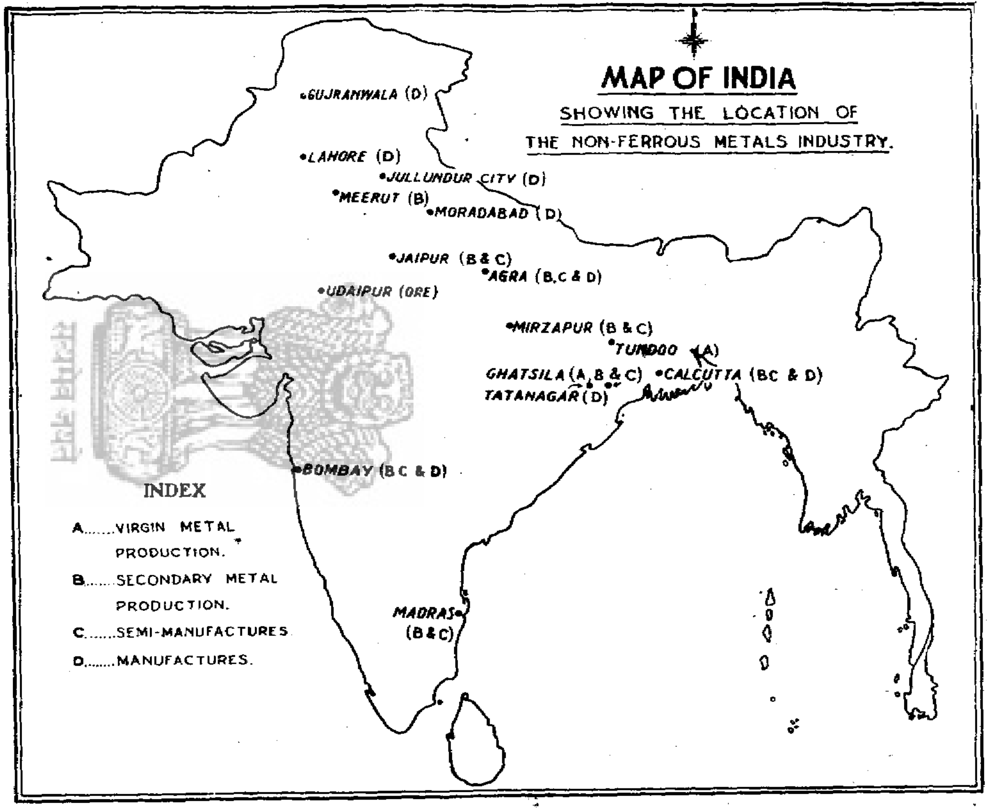
| Name of article. | Item No. | Australian Tariff Schedule. | | | Proposed Indian Tariff Schedule. | | Remarks. |
|---|---|---|---|---|---|---|---|
| | | Pref. tariff. | Intermediate tariff. | General tariff. | Item No. | Duty. | |
| Copper unwrought | 140 | .... | .... | 10 p. c. + £4 per ton = 14 p. c. | 64 (2) | Free. | |
| Copper wrought and manufactures of copper all sorts not otherwise specified. | 140 C | 50 p. c. | 50 p. c. + 6*d.* per lb. | 62½ p. c. + 6*d.* per lb. | 64 | 35 p. c. | |
| Copper scrap | 140 B | .... | .... | Free | 64 (*1*) | Free. | |
| Electrolytic Copper Rods | 140 C | 50 p. c. | 50 p. c. + 6*d.* per lb. | 62½ p. c. + 6*d.* per lb. | 64 (*a*) | 20 p. c. | Electrolytic copper rods are not separately stated in the Australian schedule. |
| Arsenical Copper Rods | 140 C | 50 p. c. | 50 p. c. + 6*d.* per lb. | 62½ p. c. + 6*d.* per lb. | 64 | 35 p. c. | Arsenical copper rods are not separately stated in the Australian schedule. |
| Nickel | 137 A (*1*) | Free | Free | 15 p. c. | 65 | Free. | |
| Nickel alloys | 139 | £3 = 3 p. c. | £3 + 10 p. c. = 13 p. c. | £3-7-6 + 10 p. c. = 13½ p. c. | 65 (*a*) | 30 p. c. | |
| Nickel alloys | 139 B | 22½ p. c. | 3½*d.* per lb. + 22½ p. c. = 40 p. c. | 3½*d* per lb + + 27½ p c 45 p c | 65 (*c*) | 30 p. c. | |
| Lead ingots, slacks, cakes, blooms, bars and pig lead. | | Not known. | .. | ... | 67 | Free | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | [illegible] | 67 (*a*) | 20 p. c. |
| Lead pipes and tubes | 141 | 10 p. c. | .... | 20 p. c. | 67 (*b*) | 35 p. c. |
| Lead sheets for tea chests | | Not known. | | .... | 67 (1) | 30 |
| Zinc unwrought | 144 B | 30s per ton = 8½ p. c. | 30s per ton + 10 p. c. = 18½ p. c. | 30s per ton + 10 p. c. = 18½ p. c. | 68 (1) | Free. |
| Zinc wrought | 144 B (2) | Free | 15 p. c. | 15 p. c. | 68 | 30 p. c. |
| Zinc sheets | 144 B (1) | Free | 15 p. c. | 15 p. c. | 68 (*a*) | 20 p. c. |
| Tin | | Not known. | | .... | 69 | Free |
| Brass ingots | 139 B | £3 = 5 p. c. | £3 + 10 p. c. = 5 = 10 p. c. = 15 p. c. | £3-7-6 = 5½ p.c. + 10 p. c. = 15½ p. c. | 70 | 15 p. c. |
| Brass manufactures not otherwise specified such as sheets, circles, rods and sections. | 139 B | 22½ p. c. | 3½*d*. per lb. + 22½ = 22½ + 22½ = 45 p. c. | 3½*d*. per lb. + 27½ p. c. = 22½ + 27½ = 50 p. c. | 70 (*a*) | 35 p. c. |
| Bronze, gun metal including phospher bronze not otherwise specified. | 139 A | £ 3 = 3 p. c. | £3 + 10 p. c. = 3 + 10 p. c. = 13 p. c. | £3-7-6 + 10 p.c. = 3½ + 10 p. c. = 13½ p. c. | 70 (*b*) | 40 p. c. |
| Bronze manufactures | 139 B | 22½ p. c. | 3½*d*. per lb. + 20 p. c. = 20 + 22½ = 42½ p. c. | 3½*d*. per lb. + 27½ p. c. = 20 + 27½ p. c. = 47½ p. c. | 70 (*b*) | 46 p. c. |
| White metal and anti-friction metals. | 138 B | £5 = 4 p. c. | £5 + 17½ p. c. = 4 + 17½ p. c. = 21½ p. c. | £6-5 + 17½ p. c. = 5½ + 17½ p. c. = 22½ p. c. | 70 (*a*) (*c*) | 50 p. c. |
| Tin solders | 139 D | 22½ p. c. | 22½ p. c. | 27½ p. c. | 70 (*c*) | 50 p. c. |
| Mazak or other alloys containing not less than 94 p. c. zinc. | 139 A | £3 = 5 p. c. | £3 + 10 p. c. = 5 + 10 p. c. = 15 p. c. | £3-7-6 + 10 p. c. = 5½ + 10 p. c. = 15½ p. c. | 70 (*e*) | Free. |

| Name of article. | Item No. | Australian Tariff Schedule. | | | Proposed Indian Tariff Schedule. | | Remarks. |
|---|---|---|---|---|---|---|---|
| | | Pref. tariff. | Intermediate tariff. | General tariff. | Item No. | Duty. | |
| Type metal | 138 B | £ 5 = 7½ per cent. | £5 + 17½ per cent = 7½ + 17½ per cent = 25 per cent. | £6-5 + 17½ per cent =10 + 17½ per cent = 27½ per cent. | 70 (*d*) | 30. | |
| All Non-Ferrous metal scrap, including alloy scrap not otherwise specified. | 139 C | Free | 15 p. c. | 15 p. c. | 70 (*f*) | Free. | |
| All Non-Ferrous virgin metals not otherwise specified. | | Not known. | | | 70 (1) | Free. | |
| Brass work, bronze work, gun metal work for general engineering and plumbing and other trades. | 192 | 30 p. c. | 50 p. c. | 57½ p. c. | 70 (*a*)<br>70 (*b*) | 35 p. c.<br>40 p. c. | |
| Paper or cambric insulated cables and poles, troughs, conduits and insulators designed as parts of a transmission or distribution system and the fittings thereof. | 181 B | 22½ p. c. | 40 p. c. | 45 p. c. | 72 (*e*) | 10 p. c. | |
| Bare hard drawn or annealed electrolytic copper wires and cables of all sizes solid or stranded and A.C.S.R. | 181 B | 20 p. c. | 37½ p. c. | 45 p. c. | 72 (*f*) | 30 p. c. | |

*Note.*—Percentage equivalent of Australian currency is approximate.

## APPENDIX XVIII

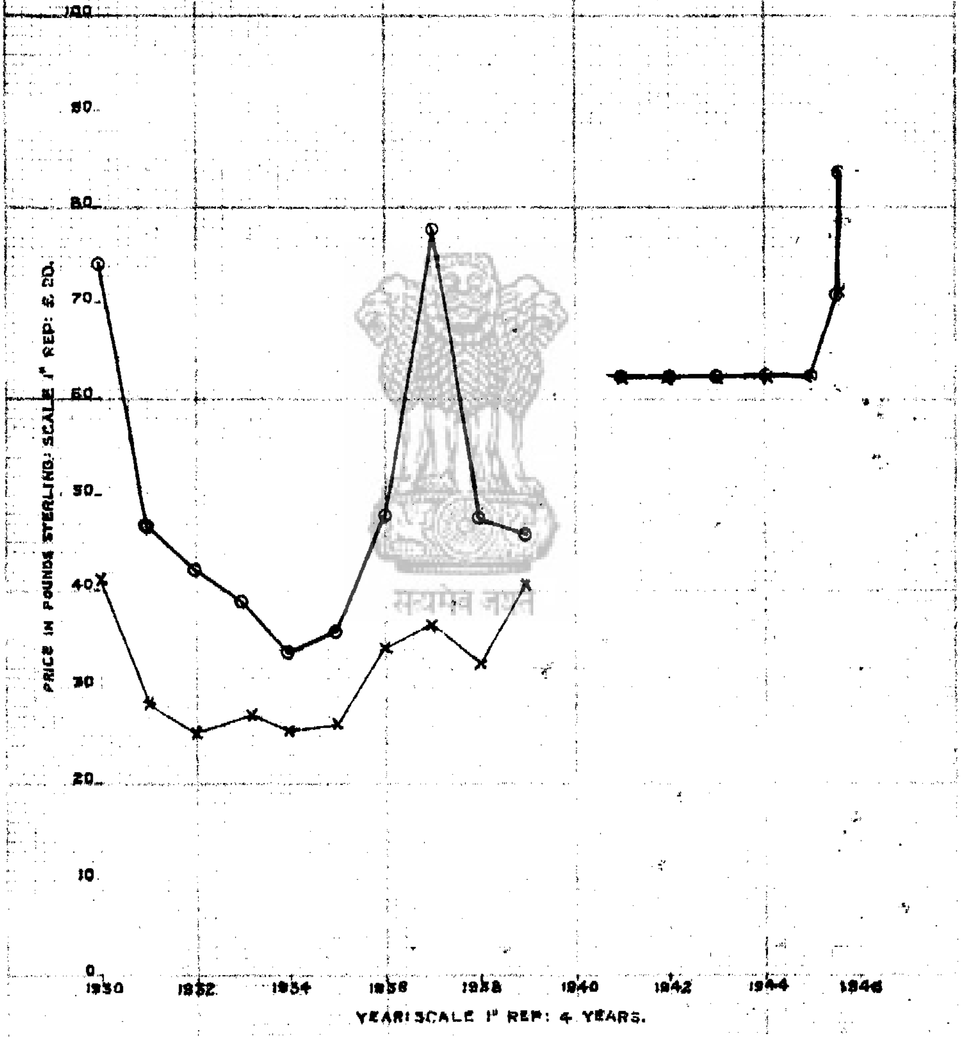


सत्यमेव जयते

# COPPER

## MAXIMUM AND MINIMUM U.K. PRICES IN POUNDS STERLING PER LONG TON.

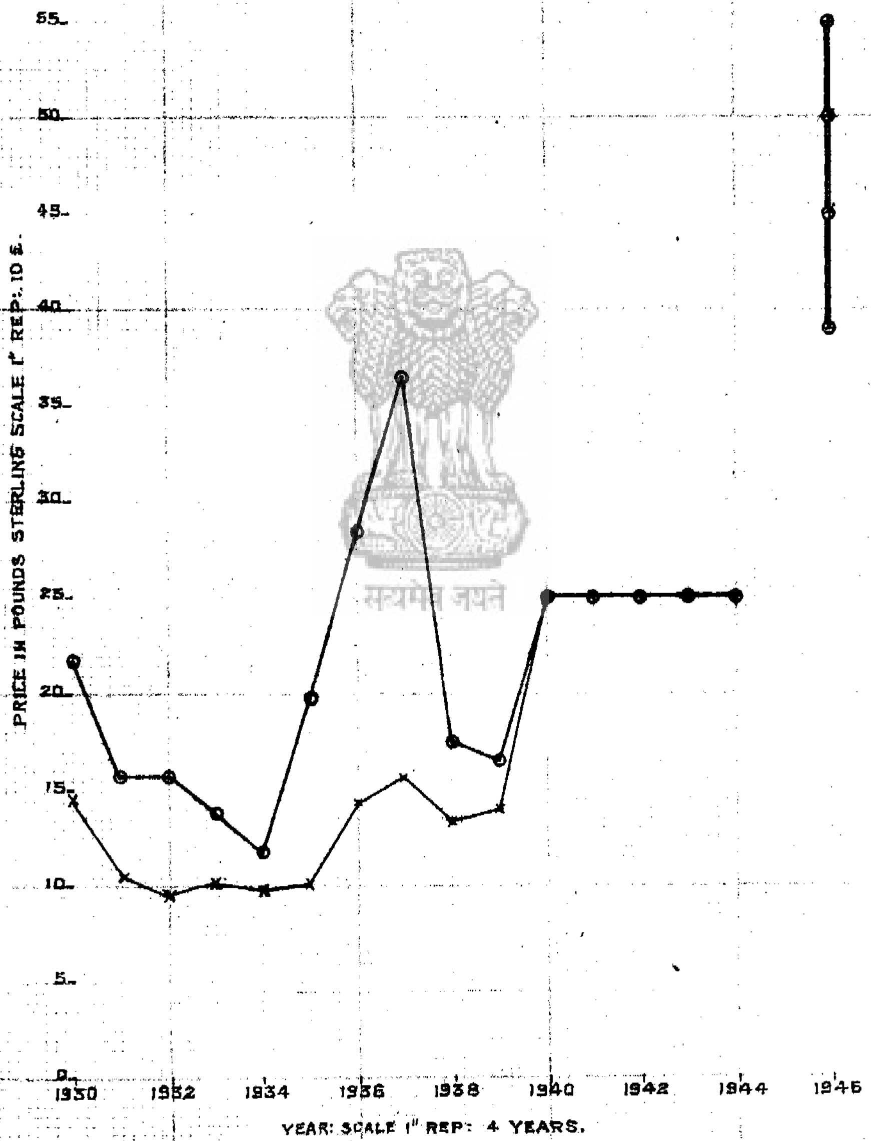
(RED LINE REPRESENTS MAXIMUM PRICES AND BLACK LINE REPRESENTS MINIMUM PRICES).



G.R.E.,P. POONA, 1946

## SOFT LEAD

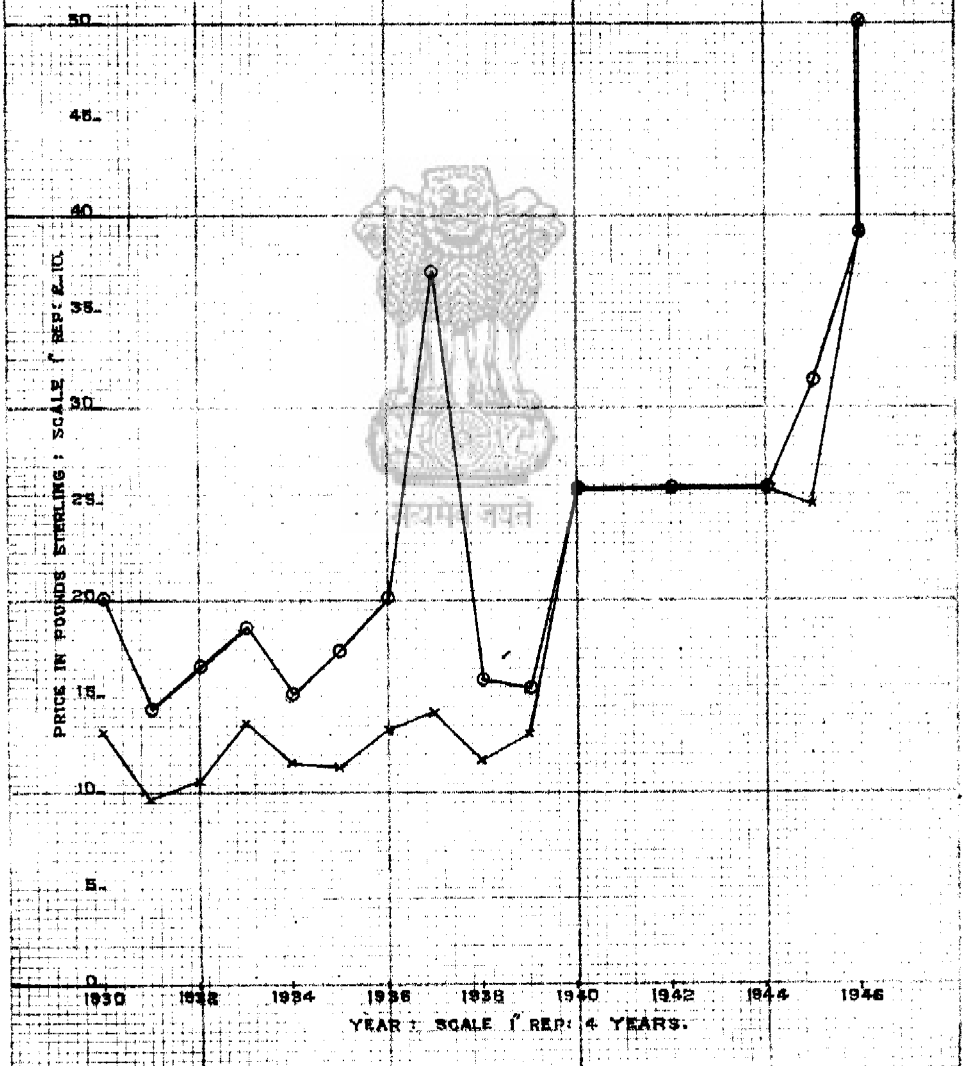
MAXIMUM AND MINIMUM PRICES IN POUNDS STERLING PER LONG TON. (RED LINE REPRESENTS MAXIMUM PRICES AND BLACK LINE REPRESENTS MINIMUM PRICES).



G.P.Z.P. POONA, 1946.

## SPELTER (ZINC)

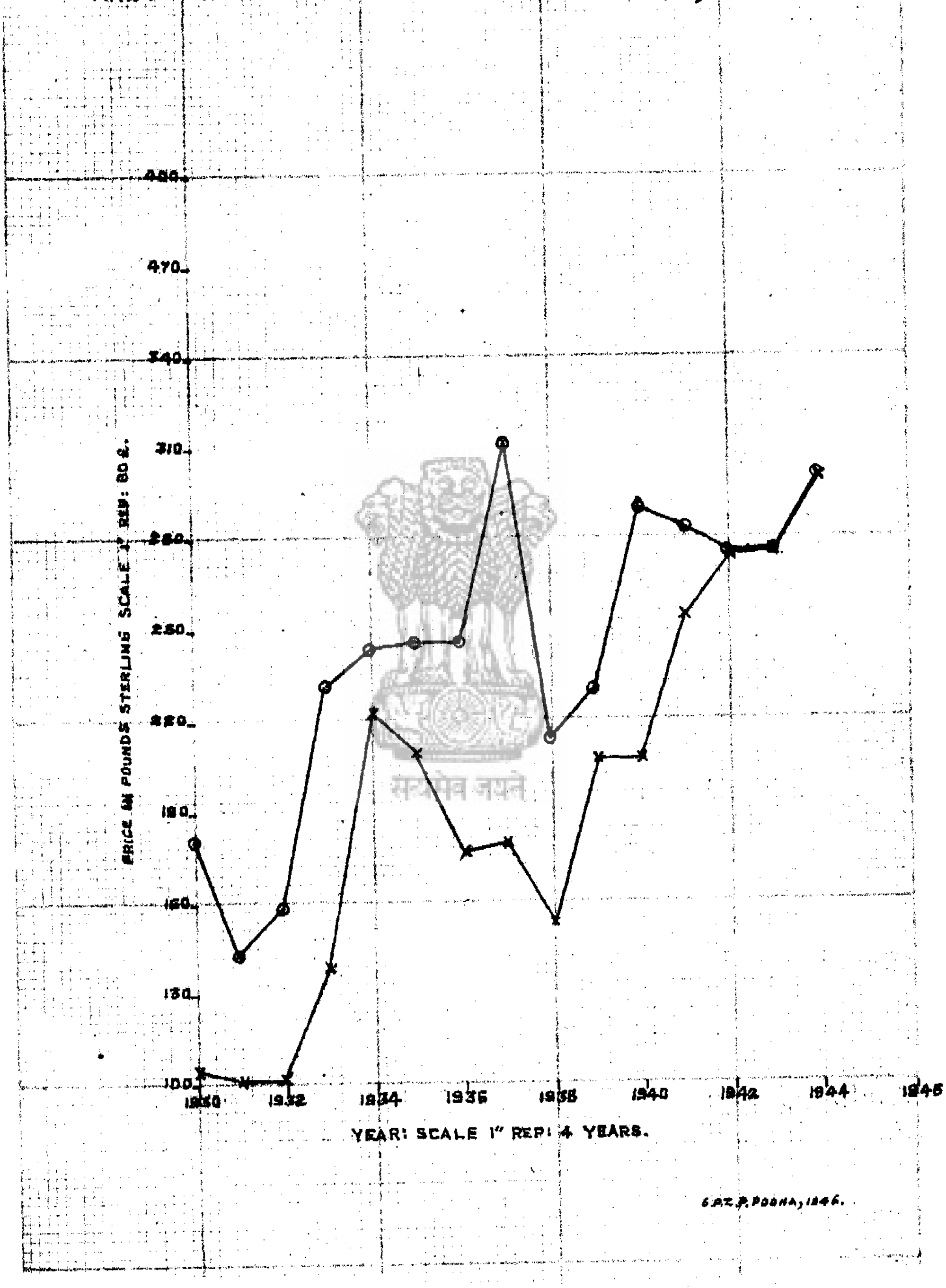
MAXIMUM AND MINIMUM PRICES IN POUNDS STERLING PER LONG TON. (RED LINE REPRESENTS MAXIMUM PRICES AND BLACK LINE REPRESENTS MINIMUM PRICES).



G.P.Z.P. POONA, 1948.

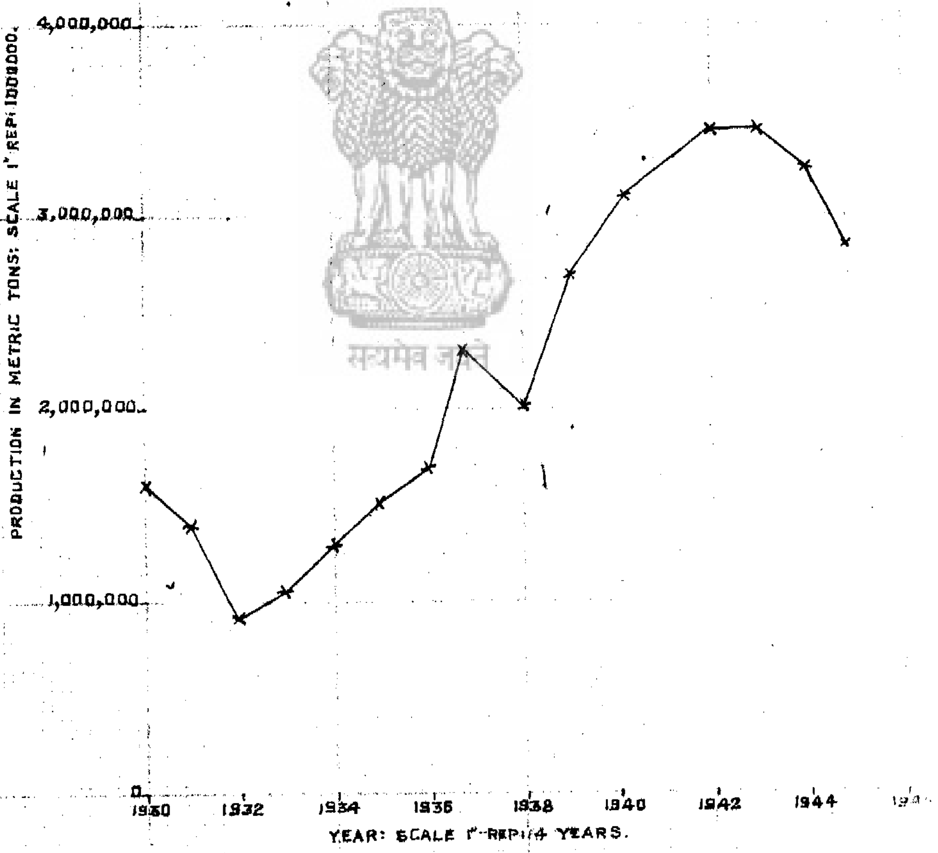
## TIN

MAXIMUM AND MINIMUM U.K. PRICES IN POUNDS STERLING PER LONG TON. (RED LINE REPRESENTS MAXIMUM PRICES AND BLACK LINE REPRESENTS MINIMUM PRICES).

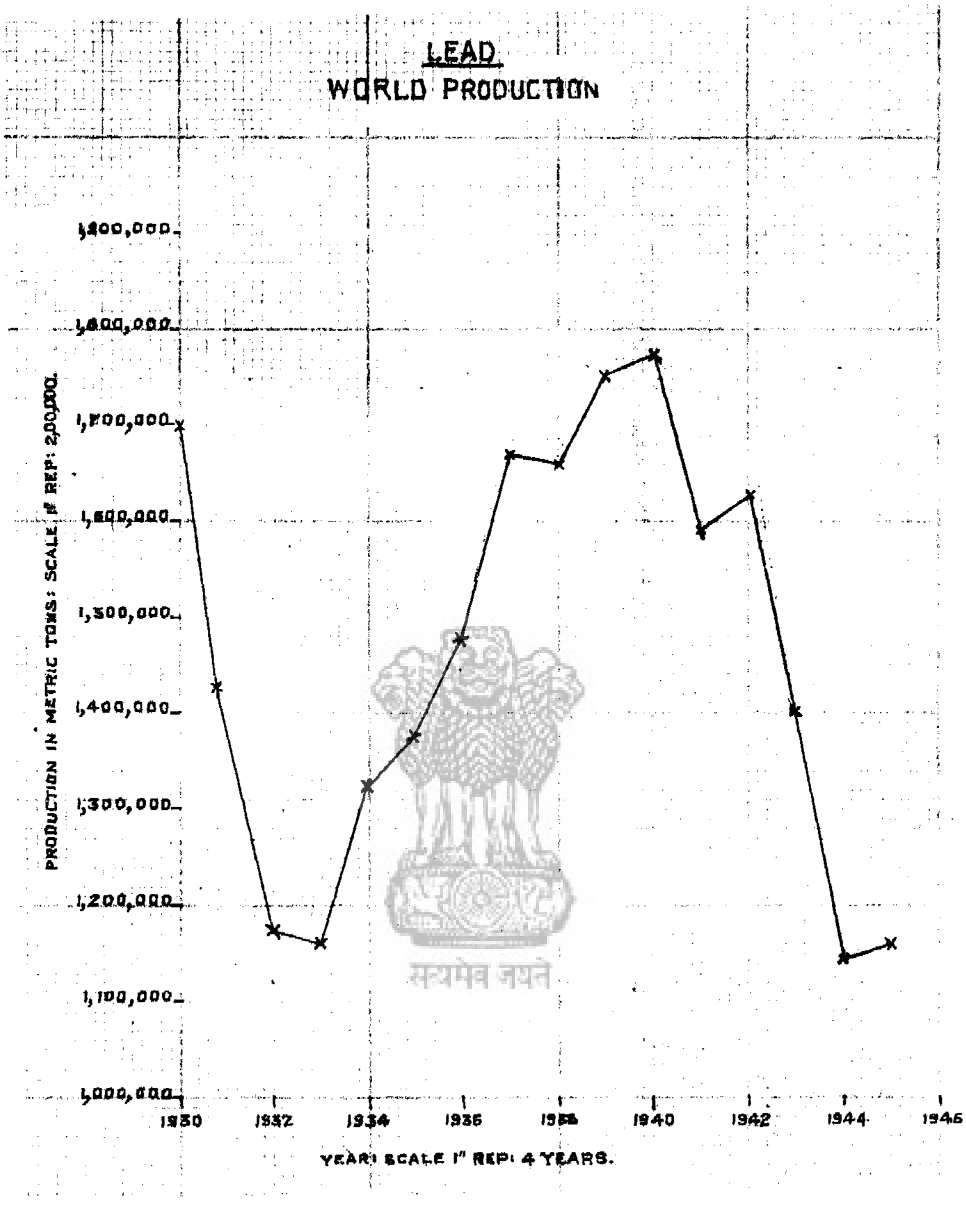


G.P.Z.P., POONA, 1946.

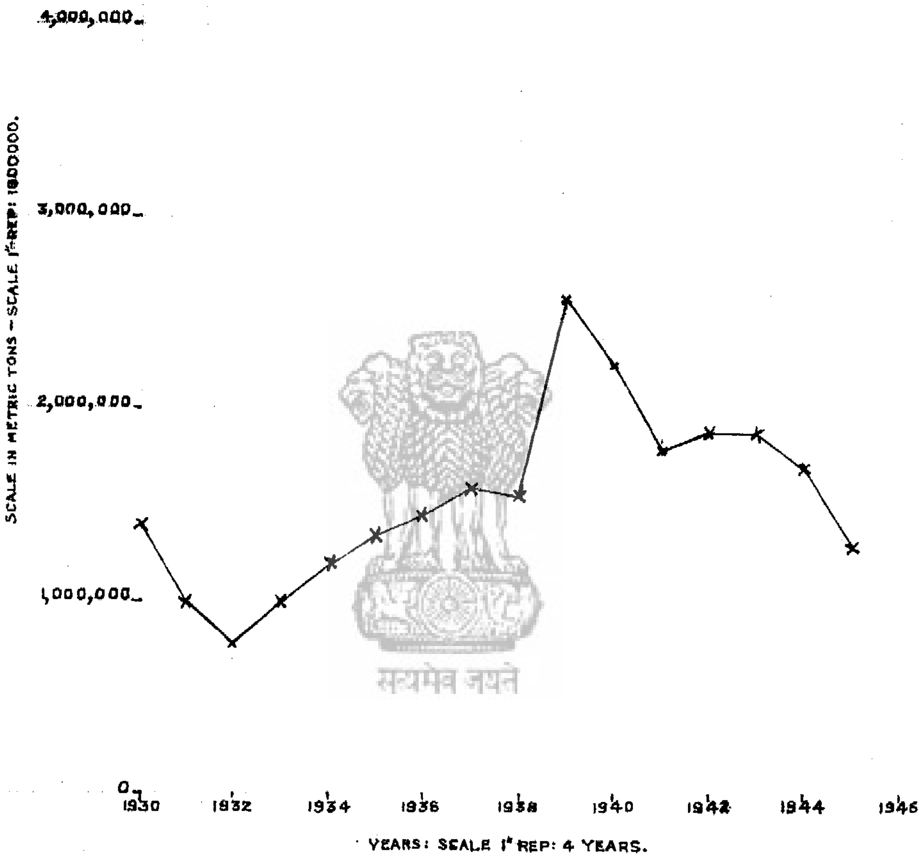
# COPPER
## WORLD PRODUCTION.



G.P.Z.F. POONA, 1946.

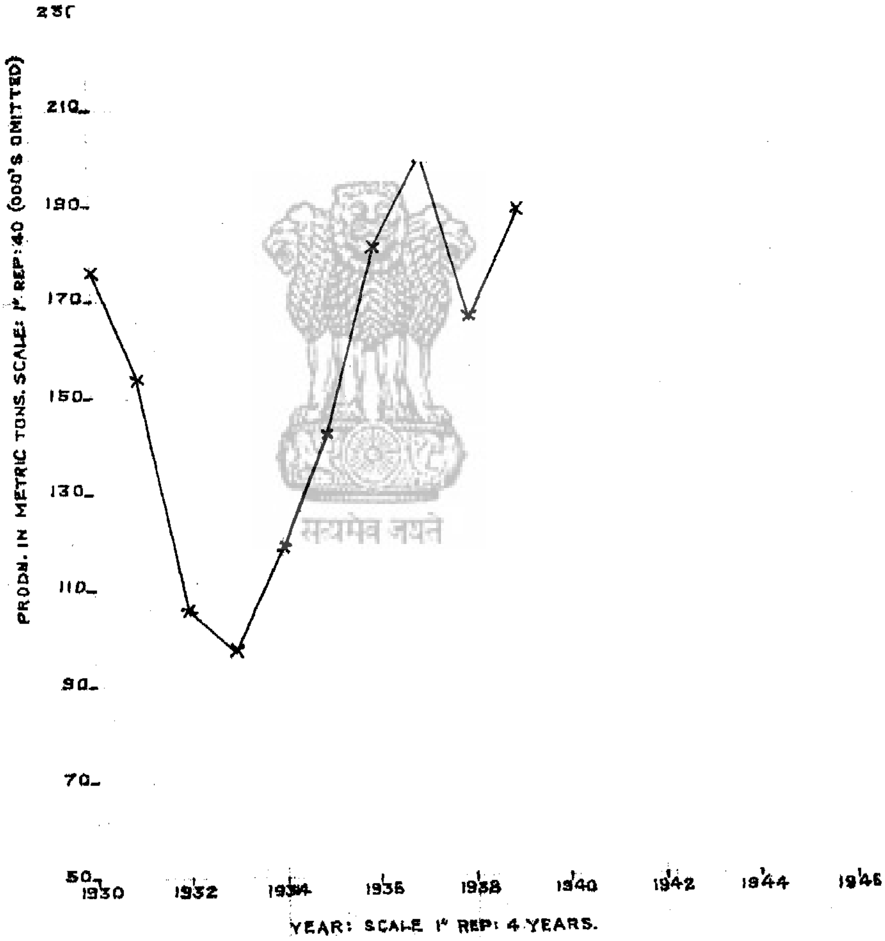
LEAD
WORLD PRODUCTION
1,900,000
1,800,000
1,700,000
1,600,000
1,500,000
1,400,000
1,300,000
1,200,000
1,100,000
1,000,000
PRODUCTION IN METRIC TONS: SCALE 1" REP: 2,00,000.
1930
1932
1934
1936
1938
1940
1942
1944
1946
YEAR: SCALE 1" REP: 4 YEARS.

# ZINC
## WORLD PRODUCTION



*G.P.Z.P. POONA, 1948.*

TIN WORLD PRODUCTION IN METRIC TONS (000'S OMITTED)
(NOTE:- WORLD PRODUCTION FIGURES AFTER 1939 ARE NOT— DEFINITELY KNOWN)



G.P.Z.P. POONA, 1946.